# AIR QUALITY PERMIT

Issued To: Montana Megawatts I, LLC
125 S. Dakota Avenue
Sioux Falls, SD 57104-6403

Permit: #3154-04
Application Complete: 7/13/06
Preliminary Determination Issued: 8/22/06
Department Decision: 9/22/06
Permit Final:
AFS #: 013-0033

An air quality permit, with conditions, is hereby granted to Montana Megawatts I, LLC (MMI), pursuant to Sections 75-2-204 and 211 of the Montana Code Annotated (MCA), as amended, and Administrative Rules of Montana (ARM) 17.8.740, *et seq*., as amended, for the following:

SECTION I: Permitted Facilities

A. Plant Location

MMI proposed to construct and operate a 262-megawatt (MW) natural gas-fired electrical power generation facility, to be located approximately 2 miles north of Great Falls, Montana, and east of U.S. Highway 87. The legal description of the site location is Section 30, Township 21 North, Range 4 East, in Cascade County, Montana.

B. Current Permit Action

The Department of Environmental Quality (Department) received a letter dated August 7, 2005, from NorthWestern Energy Development, LLC (Northwestern), requesting that the Department re-issue Montana Air Quality Permit (MAQP) #3154-03 for MMI.

The Department determined that a full preconstruction review was required since the three-year commencement of construction timeframe expired on August 10, 2005. The Department requested additional information in a letter dated September 22, 2005. On December 26, 2005, the Department received a revised permit application that included an updated Best Available Control Technology (BACT) analysis. After further correspondence, the application was deemed complete on July 13, 2006. Permit #3154-04 replaces Permit #3154-03.

The current permitting action allows MMI to operate two simple cycle gas turbines, each rated at 80-MW. Within two years, MMI is required to add additional equipment to convert the two simple cycle gas turbines into combined cycle gas turbines, for a total power production 262-MW. A complete list of the permitted equipment is contained in the permit analysis.

SECTION II: Conditions and Limitations – Simple Cycle

A. Operational and Emission Limitations

1. MMI shall operate two simple cycle natural gas turbines for up to two years after initial start-up. The combined hours of operation for the two turbines shall not exceed 5000 hours facility-wide during any 12-month time period (ARM 17.8.749, ARM 17.8.752).

2. Each simple cycle turbine shall exhaust into one of two stacks that are at least 92-feet tall (ARM 17.8.749).

3. MMI shall operate and maintain an integral dry low Nitrogen Oxide ($NO_x$) burner on each of the 80-MW turbines (ARM 17.8.749, ARM 17.8.752).

4. Emissions from each of the two simple cycle 80-MW natural gas powered turbines shall not exceed the following limits:

| | | |
|---|---|---|
| NOx | | |
| NOx- | 4-hour rolling average (ARM 17.8.749) | 39.3 lb/hr |
| NOx- | 1-hour limit, excluding startup (ARM 17.8.752) | 34.9 lb/hr |
| Carbon Monoxide (CO) | | |
| CO- | 30-day rolling average (ARM 17.8.749) | 34.8 lb/hr |
| CO- | 1-hour limit, excluding startup (ARM 17.8.752) | 21.3 lb/hr |
| Volatile Organic Compounds (VOC) | | |
| VOC- | 30-day rolling average (ARM 17.8.749) | 8.1 lb/hr |
| VOC- | 1-hour limit (ARM 17.8.752) | 9.5 lb/hr |

5. MMI shall limit the hours of operation of the 14.2 gallon per hour (1.9 million British thermal units per hour (MMBTU/hr)) diesel-fired emergency water pump to no more than 500 hours per rolling 12-month period (ARM 17.8.749).

6. MMI shall limit the hours of operation, the capacity, and/or the fuel consumption such that the sum of the $NO_x$ emissions from the facility is less than 100 tons per rolling 12-month time period. Any calculations used to establish $NO_x$ emissions shall be approved by the Department and shall be based on the $NO_x$ data from the continuous emission monitor system (CEMS) for each turbine and the hours of operation for each piece of equipment (ARM 17.8.749 and ARM 17.8.1204).

7. MMI shall limit the hours of operation, the capacity, and/or the fuel consumption such that the sum of the CO emissions from the facility is less than 100 tons per rolling 12-month time period. Any calculations used to establish CO emissions shall be approved by the Department and shall be based on the average hourly temperature from the National Weather Service office in Great Falls, the average hourly load for each turbine, and the hours of operation for each piece of equipment (ARM 17.8.749 and ARM 17.8.1204).

8. MMI shall only combust pipeline quality natural gas in the combustion turbines. (ARM 17.8.749, ARM 17.8.752 and 40 CFR 60 Subpart KKKK).

9. MMI shall operate and maintain the turbines, monitoring equipment, and ancillary equipment in a manner consistent with good air pollution control practices for minimizing emissions at all times (ARM 17.8.340 and 40 CFR 60 Subpart KKKK).

10. MMI shall not cause or authorize emissions to be discharged into the outdoor atmosphere from any sources installed after November 23, 1968, that exhibit an opacity of 20% or greater averaged over six consecutive minutes (ARM 17.8.304).

11. MMI shall not cause or authorize the use of any street, road, or parking lot without taking reasonable precautions to control emissions of airborne particulate matter (ARM 17.8.308).

12. MMI shall treat all unpaved portions of the haul roads, access roads, parking lots, or general plant area with water and/or chemical dust suppressant as necessary to maintain compliance with the reasonable precautions limitation in Section II.A.11 (ARM 17.8.749).

13. MMI shall comply with all applicable standards and limitations, and the reporting, recordkeeping, and notification requirements contained in 40 CFR 60, Subpart KKKK (ARM 17.8.340 and 40 CFR 60, Subpart KKKK).

14. MMI shall comply with all applicable standards and limitations, and the reporting, recordkeeping, and notification requirements of the Acid Rain Program contained in 40 CFR 72-78 (40 CFR 72 through 40 CFR 78).

15. The requirements of Section II of this permit shall apply for a period of two years from initial startup of the simple cycle turbines, or until the MMI facility begins operating in a combined cycle mode, whichever comes first. Upon commencement of operation in the combined cycle mode, MMI shall comply with the conditions identified in Section III of this permit (ARM 17.8.749).

B. Testing Requirements

1. MMI shall test each of the two 80-MW simple cycle turbines to demonstrate compliance with the steady-state $NO_x$ and CO emission limits contained in Section II.A.4. Testing shall be conducted concurrently for $NO_x$ and CO, within 180 days of initial start-up of each of the simple cycle turbines, and shall conform with the requirements contained in 40 CFR 60 Subpart KKKK (ARM 17.8.105, 17.8.749, and 40 CFR 60 Subpart KKKK).

2. All compliance source tests shall conform to the requirements of the Montana Source Test Protocol and Procedures Manual (ARM 17.8.106).

3. The Department may require further testing (ARM 17.8.105).

C. Continuous Emissions Monitoring Systems (CEMS)

1. MMI shall install, operate, calibrate, and maintain CEMS as follows:

   a. MMI shall operate a CEMS for the measurement of $NO_X$ on each simple cycle stack, and use the data to monitor compliance with the $NO_x$ emission limits contained in Section II.A.4 and Section II.A.6 (ARM 17.8.105, 17.8.749, 40 CFR 60 Subpart KKKK, and 40 CFR 72-78).

   b. A CEMS for the measurement of oxygen ($O_2$) or carbon dioxide ($CO_2$) content shall be operated on each simple cycle stack (ARM 17.8.105, ARM 17.8.749, and 40 CFR 60 Subpart KKKK).

2. All continuous monitors required by this permit and by 40 CFR Part 60 shall be operated, excess emissions reported as per Attachment #2 of this permit, and performance tests conducted in accordance with the requirements of 40 CFR Part 60, Subpart A; 40 CFR Part 60, Appendix B (Performance Specifications #1, #2, and #3); 40 CFR Part 60, Subpart KKKK and 40 CFR Part 72-78, as applicable (ARM 17.8.749, 40 CFR 60, and 40 CFR 72-78).

3. MMI shall develop and keep on-site a quality assurance plan for all the CEMS (40 CFR Part 60, Subpart KKKK).

4. On-going quality assurance for the CEMS must conform to 40 CFR Part 60, Appendix F (ARM 17.8.749, 40 CFR Part 60 Appendix F).

5. MMI shall maintain a file of all measurements from the CEMS, and performance testing measurements: all CEMS performance evaluations; all CEMS or monitoring device calibration checks and audits; and adjustments and maintenance performed on these systems or devices, recorded in a permanent form suitable for inspection. The records shall be retained on site for at least 5 years following the date of such measurements and reports. MMI shall supply these records to the Department upon request (ARM 17.8.749).

D. Operational Reporting Requirements

1. MMI shall supply the Department with annual production information for all emission points, as required by the Department in the annual emission inventory request. The request will include, but is not limited to, all sources of emissions identified in the emission inventory contained in the permit analysis.

   Production information shall be gathered on a calendar-year basis and submitted to the Department by the date required in the emission inventory request. Information shall be in the units required by the Department. This information may be used to calculate operating fees, based on actual emissions from the facility, and/or to verify compliance with permit limitations (ARM 17.8.505).

2. MMI shall document, by month, the hours of operation for each of the two simple cycle turbines. By the 25$^{th}$ day of each month, MMI shall total the hours of operation for each of the two simple cycle turbines, during the previous month. The monthly information will be used to verify compliance with the rolling 12-month limitation in Section II.A.1. The information for each of the previous months shall be submitted along with the annual emissions inventory (ARM 17.8.749).

3. MMI shall document the amount of $NO_x$ emissions from each turbine at least once per hour. In addition, at least once per hour MMI shall calculate the previous 4-hour rolling average emission rate for each of the turbines, in conformance with the requirements contained in 40 CFR 60 Subpart KKKK. These emission rates will be used to verify compliance with the limitations in Section II.A.4. (ARM 17.8.749 and 40 CFR 60 Subpart KKKK).

4. MMI shall document, by month, the amount of $NO_x$ emissions from the facility. By the 25$^{th}$ day of each month, MMI shall total the amount of $NO_x$ emissions from the facility during the previous month. The monthly information will be used to verify compliance with the rolling 12-month limitation in Section II.A.6. The information for each of the previous months shall be submitted along with the annual emissions inventory (ARM 17.8.749).

5. MMI shall document, by month, the amount of CO emissions from the facility. By the 25$^{th}$ day of each month, MMI shall total the amount of CO emissions from the facility during the previous month. The monthly information will be used to verify compliance with the rolling 12-month limitation in Section II.A.7. The information for each of the previous months shall be submitted along with the annual emissions inventory (ARM 17.8.749).

6. MMI shall notify the Department of any construction or improvement project conducted pursuant to ARM 17.8.745, that would include a change in control equipment, stack height, stack diameter, stack flow, stack gas temperature, source location or fuel specifications, or would result in an increase in source capacity above its permitted operation or the addition of a new emission unit. The notice must be submitted to the Department, in writing, 10 days prior to start up or use of the proposed de minimis change, or as soon as reasonably practicable in the event of an unanticipated circumstance causing the de minimis change, and must include the information requested in ARM 17.8.745(1)(d) (ARM 17.8.745).

7. All records compiled in accordance with this permit must be maintained by MMI as a permanent business record for at least five years following the date of the measurement, must be available at the plant site for inspection by the Department, and must be submitted to the Department upon request (ARM 17.8.749).

8. MMI shall annually certify that its emissions are less than those that would require the facility to obtain an air quality operating permit as required by ARM 17.8.1204(3)(b). The annual certification shall comply with the certification requirements of ARM 17.8.1207. The annual certification shall be submitted along with the annual emissions inventory information (ARM 17.8.749 and ARM 17.8.1204).

E. Notification

MMI shall provide the Department with written notification of the following dates within the specified time periods (ARM 17.8.749):

1. Commencement of construction of the power generation facility within 30 days after commencement of construction;

2. Actual start-up date of each of the 80-MW turbines within 15 days after the actual start-up of the turbine.

SECTION III: Conditions and Limitations – Combined Cycle

A. Operational and Emission Limitations

1. MMI shall operate and maintain two combined cycle electric generating systems. Each system will consist of a natural gas-fired 80-MW turbine and a heat recovery steam generator (HRSG) with a 121.9 million British thermal unit per hour (MM Btu/hr) natural-gas fired duct burner (ARM 17.8.749).

2. Exhaust from each turbine/HRSG shall exhaust into one of two stacks that are at least 120-feet tall (ARM 17.8.749).

3. MMI shall operate and maintain the integral dry low NOx burner on each of the 80-MW turbines (ARM 17.8.749 and ARM 17.8.752).

4. MMI shall operate and maintain a selective catalytic reduction (SCR) unit and a catalytic oxidizer on each combined cycle turbine/HRSG stack (ARM 17.8.749 and 17.8.752).

5. MMI shall operate and maintain the turbines, air pollution control equipment, and monitoring equipment in a manner consistent with good air pollution control practice for minimizing emissions at all times including during startup, shutdown, and malfunctions (40 CFR 60 Subpart KKKK).

6. Emissions from each of the combined turbine/HRSG stacks shall not exceed the following limits:

| | | |
|---|---|---|
| NOx | | |
| NOx- | 30-day rolling average (ARM 17.8.749) | 8.9 lb/hr |
| NOx- | 1-hour limit, excluding startup (ARM 17.8.752) | 9.7 lb/hr |
| Carbon Monoxide (CO) | | |
| CO- | 30-day rolling average (ARM 17.8.749) | 10.9 lb/hr |
| CO- | 1-hour limit, excluding startup (ARM 17.8.752) | 11.8 lb/hr |
| Volatile Organic Compounds (VOC) | | |
| VOC- | 1-hour limit (ARM 17.8.752) | 2.7 lb/hr |
| Particulate Matter less than or equal to 10 microns ($PM_{10}$) | | |
| $PM_{10}$- | Turbine only – 1-hour limit (ARM 17.8.752) | 10.0 lb/hr |
| $PM_{10}$- | Turbine plus duct burner – 1-hour limit (ARM 17.8.752) | 11.2 lb/hr |
| Sulfur Dioxide ($SO_2$) | | |
| $SO_2$- | 1-hour limit (ARM 17.8.752) | 1.4 lb/hr |

7. MMI shall limit the hours of operation, the capacity, and/or the fuel consumption of the equipment such that the sum of the $NO_x$ emissions from the facility is less than 100 tons per rolling 12-month period. Any calculations used to establish $NO_x$ emissions from the turbines shall be approved by the Department and shall be based on the $NO_x$ data from the CEMS for each turbine unit (ARM 17.8.749 and ARM 17.8.1204).

8. MMI shall limit the hours of operation, the capacity, and/or the fuel consumption of the equipment such that total CO from the facility is less than 100 tons per rolling 12-month period. Any calculations used to establish CO emissions from the turbines shall be approved by the Department and shall be based on the CO data from the CEMS for each turbine (ARM 17.8.749 and ARM 17.8.1204).

9. MMI shall limit the hours of operation, the capacity, and/or the fuel consumption such that the total PM/$PM_{10}$ from the facility is less than 100 tons per rolling 12-month period. Any calculations used to establish PM and $PM_{10}$ emissions shall be approved by the Department (ARM 17.8.749 and ARM 17.8.1204).

10. MMI shall limit the combined hours of operation of the two duct burners to no more than 12,000 hours per rolling 12-month period (ARM 17.8.749 and ARM 17.8.1204).

11. MMI shall only combust pipeline quality natural gas in the turbines and duct burners (ARM 17.8.749 and 40 CFR 60 Subpart KKKK).

12. MMI shall limit the hours of operation of the 14.2 gallon per hour (1.9 MMBTU/hr) diesel-fired emergency water pump to no more than 500 hours per rolling 12-month period (ARM 17.8.749).

13. MMI is required to operate and maintain high efficiency drift eliminators on the cooling tower so drift emissions are limited to no more than 0.002% of circulating water flow (ARM 17.8.752).

14. MMI shall not cause or authorize emissions to be discharged into the outdoor atmosphere from any sources installed after November 23, 1968, that exhibit an opacity of 20% or greater averaged over six consecutive minutes (ARM 17.8.304).

15. MMI shall not cause or authorize the use of any street, road, or parking lot without taking reasonable precautions to control emissions of airborne particulate matter (ARM 17.8.308).

16. MMI shall treat all unpaved portions of the haul roads, access roads, parking lots, or general plant area with water and/or chemical dust suppressant as necessary to maintain compliance with the reasonable precautions limitation in Section III.A.15 (ARM 17.8.749).

17. MMI shall comply with all applicable standards and limitations, and the reporting, recordkeeping, and notification requirements contained in 40 CFR 60, Subpart KKKK (ARM 17.8.340 and 40 CFR 60, Subpart KKKK).

18. MMI shall comply with all applicable standards and limitations, and the reporting, recordkeeping, and notification requirements of the Acid Rain Program contained in 40 CFR 72-78 (40 CFR 72 through 40 CFR 78).

B. Testing Requirements

1. MMI shall test each of the two combined cycle turbine/HRSG units to demonstrate compliance with the $NO_x$ and CO emission limits contained in Section III.A.6. Testing shall be conducted concurrently, for $NO_x$ and CO, within 180 days of initial start-up of each combined cycle system, and shall conform with the requirements contained in 40 CFR 60 Subpart KKKK (ARM 17.8.105, ARM 17.8.749, 40 CFR 60.8 and 40 CFR 60 Subpart KKKK).

2. MMI shall test each of the two combined cycle turbine/HRSG units for $PM_{10}$, to demonstrate compliance with the $PM_{10}$ emission limits contained in Section III.A.6. Testing shall be conducted within 180 days of initial start-up and continue on an every five-year basis or another testing/monitoring schedule as may be approved by the Department (ARM 17.8.105 and 17.8.749).

3. All compliance source tests shall conform to the requirements of the Montana Source Test Protocol and Procedures Manual (ARM 17.8.106).

4. The Department may require further testing (ARM 17.8.105).

C. Continuous Emissions Monitoring Systems (CEMS)

1. MMI shall install, operate, calibrate, and maintain CEMS as follows:

   a. MMI shall operate a CEMS for the measurement of $NO_X$ on each combined turbine/HRSG stack, and use the data to monitor compliance with the $NO_x$ emission limits contained in Section III.A.6 and Section III.A.7 (ARM 17.8.105, 17.8.749, 40 CFR 60 Subpart KKKK, and 40 CFR 72-78).

   b. MMI shall operate a CEMS for the measurement of CO on each combined turbine/HRSG stack, and use the data to monitor compliance with the CO emission limits contained in Section III.A.6 and Section III.A.8 (ARM 17.8.105, 17.8.749).

c. A CEMS for the measurement of oxygen ($O_2$) or carbon dioxide ($CO_2$) content shall be operated on each combined turbine/HRSG stack (ARM 17.8.105, ARM 17.8.749, and 40 CFR 60 Subpart KKKK).

2. All continuous monitors required by this permit and by 40 CFR Part 60 shall be operated, excess emissions reported as per Attachment #2 of this permit, and performance tests conducted in accordance with the requirements of 40 CFR Part 60, Subpart A; 40 CFR Part 60, Subpart KKKK; 40 CFR Part 60, Appendix B (Performance Specifications #1, #2, and #3); and 40 CFR Part 72-78, as applicable (ARM 17.8.749, 40 CFR 60, and 40 CFR 72-78).

3. MMI shall develop and keep on-site a quality assurance plan for all the CEMS (40 CFR Part 60, Subpart KKKK).

4. On-going quality assurance for the CEMS must conform to 40 CFR Part 60, Appendix F (ARM 17.8.749).

5. MMI shall maintain a file of all measurements from the CEMS, and performance testing measurements: all CEMS performance evaluations; all CEMS or monitoring device calibration checks and audits; and adjustments and maintenance performed on these systems or devices, recorded in a permanent form suitable for inspection. The records shall be retained on site for at least 5 years following the date of such measurements and reports. MMI shall supply these records to the Department upon request (ARM 17.8.749).

6. MMI shall develop a custom schedule for determination of total sulfur content by either using the fuel quality characteristics in a current, valid purchase contract, tariff sheet or transportation contract or conducting representative fuel sampling (40 CFR Part 60, Subpart KKKK).

D. Operational Reporting Requirements

1. MMI shall supply the Department with annual production information for all emission points, as required by the Department in the annual emission inventory request. The request will include, but is not limited to, all sources of emissions identified in the emission inventory contained in the permit analysis.

   Production information shall be gathered on a calendar-year basis and submitted to the Department by the date required in the emission inventory request. Information shall be in the units required by the Department. This information may be used to calculate operating fees, based on actual emissions from the facility, and/or to verify compliance with permit limitations (ARM 17.8.505).

2. MMI shall document, by month, the amount of $NO_x$ emissions from the facility. By the 25$^{th}$ day of each month, MMI shall total the amount of $NO_x$ emissions from the facility during the previous month. The monthly information will be used to verify compliance with the rolling 12-month limitation in Section III.A.7. The information for each of the previous months shall be submitted along with the annual emissions inventory (ARM 17.8.749).

3. MMI shall document, by month, the amount of CO emissions from the facility. By the 25$^{th}$ day of each month, MMI shall total the amount of CO emissions from the facility during the previous month. The monthly information will be used to verify compliance

with the rolling 12-month limitation in Section III.A.8. The information for each of the previous months shall be submitted along with the annual emissions inventory (ARM 17.8.749).

4. MMI shall document, by month, the amount of PM and $PM_{10}$ emissions from the facility. By the 25th day of each month, MMI shall total the amount of PM and $PM_{10}$ emissions from the facility during the previous month. The monthly information will be used to verify compliance with the rolling 12-month limitation in Section III.A.9. The information for each of the previous months shall be submitted along with the annual emissions inventory (ARM 17.8.749).

5. MMI shall document, by month, the total hours of operation of the HRSG duct burners. By the 25th day of each month, MMI shall total the combined hours of operation of the HRSG duct burners from the facility during the previous month. The monthly information will be used to verify compliance with the rolling 12-month limitation in Section III.A.10. The information for each of the previous months shall be submitted along with the annual emissions inventory (ARM 17.8.749).

6. MMI shall document, by month, the total hours of operation of the emergency water pump. By the 25th day of each month, MMI shall total the combined hours of operation of the emergency water pump from the facility during the previous month. The monthly information will be used to verify compliance with the rolling 12-month limitation in Section III.A.12. The information for each of the previous months shall be submitted along with the annual emissions inventory (ARM 17.8.749).

7. MMI shall notify the Department of any construction or improvement project conducted pursuant to ARM 17.8.745, that would include a change in control equipment, stack height, stack diameter, stack flow, stack gas temperature, source location or fuel specifications, or would result in an increase in source capacity above its permitted operation or the addition of a new emission unit. The notice must be submitted to the Department, in writing, 10 days prior to start up or use of the proposed de minimis change, or as soon as reasonably practicable in the event of an unanticipated circumstance causing the de minimis change, and must include the information requested in ARM 17.8.745(1)(d) (ARM 17.8.745).

8. All records compiled in accordance with this permit must be maintained by MMI as a permanent business record for at least five years following the date of the measurement, must be available at the plant site for inspection by the Department, and must be submitted to the Department upon request (ARM 17.8.749).

9. MMI shall annually certify that its emissions are less than those that would require the facility to obtain an air quality operating permit as required by ARM 17.8.1204(3)(b). The annual certification shall comply with the certification requirements of ARM 17.8.1207. The annual certification shall be submitted along with the annual emissions inventory information (ARM 17.8.749 and ARM 17.8.1204).

E. Notification

MMI shall provide the Department with written notification of the following dates within the specified time periods (ARM 17.8.749 and 40 CFR 60 Subpart KKKK):

1. Commencement of construction of the HRSG units within 30 days after commencement of construction; and

2. Actual start-up date of each of the combined turbines/HRSG units within 15 days after the actual start-up of each turbine/HRSG unit.

SECTION IV: General Conditions

A. Inspection – MMI shall allow the Department's representatives access to the source at all reasonable times for the purpose of making inspections or surveys, collecting samples, obtaining data, auditing any monitoring equipment (CEMS, CERMS) or observing any monitoring or testing, and otherwise conducting all necessary functions related to this permit.

B. Waiver – The permit and the terms, conditions, and matters stated herein shall be deemed accepted if MMI fails to appeal as indicated below.

C. Compliance with Statutes and Regulations – Nothing in this permit shall be construed as relieving MMI of the responsibility for complying with any applicable federal or Montana statute, rule, or standard, except as specifically provided in ARM 17.8.740, *et seq*. (ARM 17.8.756).

D. Enforcement – Violations of limitations, conditions and requirements contained herein may constitute grounds for permit revocation, penalties, or other enforcement action as specified in Section 75-2-401, *et seq*., MCA.

E. Appeals – Any person or persons jointly or severally adversely affected by the Department's decision may request, within 15 days after the Department renders its decision, upon affidavit setting forth the grounds therefore, a hearing before the Board of Environmental Review (Board). A hearing shall be held under the provisions of the Montana Administrative Procedures Act. The filing of a request for a hearing does not stay the Department's decision, unless the Board issues a stay upon receipt of a petition and a finding that a stay is appropriate under Section 75-2-211(11)(b), MCA. The issuance of a stay on a permit by the Board postpones the effective date of the Department's decision until conclusion of the hearing and issuance of a final decision by the Board. If a stay is not issued by the Board, the Department's decision on the application is final 16 days after the Department's decision is made.

F. Permit Inspection – As required by ARM 17.8.755, Inspection of Permit, a copy of the air quality permit shall be made available for inspection by the Department at the location of the source.

G. Construction Commencement – Construction must begin within three years of permit issuance and proceed with due diligence until the project is complete or the permit shall be revoked (ARM 17.8.762).

H. Permit Fee – Pursuant to Section 75-2-220, MCA, as amended by the 1991 Legislature, failure to pay the annual operation fee by MMI may be grounds for revocation of this permit, as required by that section and rules adopted thereunder by the Board.

Attachment 1

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Attachment 2

## INSTRUCTIONS FOR COMPLETING EXCESS EMISSION REPORTS (EER)

PART 1 Complete as shown. Report total time during the reporting period in hours. The determination of plant operating time (in hours) includes time during unit start up, shut down, malfunctions, or whenever pollutants of any magnitude are generated, regardless of unit condition or operating load.

Excess emissions include all time periods when emissions, as measured by the CEMS, exceed any applicable emission standard for any applicable time period.

Percent of time in compliance is to be determined as:

$$\left(1 - \left(\text{total hours of excess emissions during reporting period} / \text{total hours of CEMS availability during reporting period}\right)\right) \times 100$$

PART 2 Complete as shown. Report total time the point source operated during the reporting period in hours. The determination of point source operating time includes time during unit start up, shut down, malfunctions, or whenever pollutants (of any magnitude) are generated, regardless of unit condition or operating load.

Percent of time CEMS was available during point source operation is to be determined as:

$$\left(1 - \left(\text{CEMS downtime in hours during the reporting period}^{a} / \text{total hours of point source operation during reporting period}\right)\right) \times 100$$

a - All time required for calibration and to perform preventative maintenance must be included in the CEMS downtime.

PART 3 Complete a separate sheet for each pollutant control device. Be specific when identifying control equipment operating parameters. For example: number of TR units, energizers for electrostatic precipitators (ESP); pressure drop and effluent temperature for baghouses; and bypass flows and pH levels for scrubbers. For the initial EER, include a diagram or schematic for each piece of control equipment.

PART 4 Use Table I as a guideline to report <u>all</u> excess emissions. Complete a separate sheet for each monitor. Sequential numbering of each excess emission is recommended. For each excess emission, indicate: 1) time and duration, 2) nature and cause, and 3) action taken to correct the condition of excess emissions. Do not use computer reason codes for corrective actions or nature and cause; rather, be specific in the explanation. If no excess emissions occur during the quarter, it must be so stated.

PART 5 Use Table II as a guideline to report all CEM system upsets or malfunctions. Complete a separate sheet for each monitor. List the time, duration, nature and extent of problems, as well as the action taken to return the CEM system to proper operation. Do not use reason codes for nature, extent or corrective actions. Include normal calibrations and maintenance as prescribed by the monitor manufacturer. Do not include zero and span checks.

PART 6 Complete a separate sheet for each pollutant control device. Use Table III as a guideline to report operating status of control equipment during the excess emission. Follow the number sequence as recommended for excess emissions reporting. Report operating parameters consistent with Part 3, Subpart e.

PART 7 Complete a separate sheet for each monitor. Use Table IV as a guideline to summarize excess emissions and monitor availability.

PART 8 Have the person in charge of the overall system and reporting certify the validity of the report by signing in Part 8.

## EXCESS EMISSIONS REPORT

**PART 1**

a. Emission Reporting Period _____

b. Report Date _____

c. Person Completing Report _____

d. Plant Name _____

e. Plant Location _____

f. Person Responsible for Review and Integrity of Report _____

g. Mailing Address for 1.f. _____

_____

h. Phone Number of 1.f. _____

i. Total Time in Reporting Period _____

j. Total Time Plant Operated During Quarter _____

k. Permitted Allowable Emission Rates: Opacity _____

$SO_2$ _____ $NO_x$ _____ TRS _____

l. Percent of Time Out of Compliance: Opacity _____

$SO_2$ _____ $NO_x$ _____ TRS _____

m. Amount of Product Produced During Reporting Period _____

n. Amount of Fuel Used During Reporting Period _____

**PART 2 - Monitor Information: Complete for each monitor.**

a. Monitor Type (circle one)

Opacity $SO_2$ $NO_x$ $O_2$ $CO_2$ TRS Flow

b. Manufacturer _____

c. Model No. _____ _____

d. Serial No. _____

e. Automatic Calibration Value: Zero _____ Span _____

f. Date of Last Monitor Performance Test _____

g. Percent of Time Monitor Available:

1) During reporting period _____

2) During plant operation _____

h. Monitor Repairs or Replaced Components Which Affected or Altered Calibration Values _____

i. Conversion Factor (f-Factor, etc.)

j. Location of monitor (e.g. control equipment outlet)

**PART 3 - Parameter Monitor of Process and Control Equipment. (Complete one sheet for each pollutant.)**

a. Pollutant (circle one):

Opacity $SO_2$ $NO_x$ TRS

b. Type of Control Equipment _____

c. Control Equipment Operating Parameters (i.e., delta P, scrubber water flow rate, primary and secondary amps, spark rate)

_____

d. Date of Control Equipment Performance Test _____

e. Control Equipment Operating Parameter During Performance Test

_____

_____

_____

_____

PART 4 - Excess Emission (by Pollutant)

Use Table I: Complete table as per instructions. Complete one sheet for each monitor.

PART 5 - Continuous Monitoring System Operation Failures

Use Table II: Complete table as per instructions. Complete one sheet for each monitor.

PART 6 - Control Equipment Operation During Excess Emissions

Use Table III: Complete as per instructions. Complete one sheet for each pollutant control device.

PART 7 - Excess Emissions and CEMS performance Summary Report

Use Table IV: Complete one sheet for each monitor.

PART 8 - Certification for Report Integrity, by person in 1.f.

THIS IS TO CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE, THE INFORMATION PROVIDED IN THE ABOVE REPORT IS COMPLETE AND ACCURATE.

SIGNATURE _____

NAME _____

TITLE _____

DATE _____

TABLE I

EXCESS EMISSIONS

| Date | Time From | To | Duration | Magnitude | Explanation/Corrective Action |
|---|---|---|---|---|---|

TABLE II

CONTINUOUS MONITORING SYSTEM OPERATION FAILURES

| Date | Time From | To | Duration | Problem/Corrective Action |
|---|---|---|---|---|

TABLE III

CONTROL EQUIPMENT OPERATION DURING EXCESS EMISSIONS

| Date | Time From | To | Duration | Operating Parameters | Corrective Action |
|---|---|---|---|---|---|

TABLE IV

Excess Emission and CEMS Performance Summary Report

Pollutant (circle one): $SO_2$ $NO_x$ TRS $H_2S$ CO Opacity

Monitor ID

| Emission data summary [1] | **CEMS performance summary** [1] |
|---|---|
| 1. Duration of excess emissions in reporting period due to:<br><br>a. Startup/shutdown<br>b. Control equipment problems<br>c. Process problems<br>d. Other known causes<br>e. Unknown causes<br><br>2. Total duration of excess emissions<br><br>3. [ Total duration of excess emissions / Total time CEM operated X 100 = ] | 1. CEMS[2] downtime in reporting due to:<br><br>a. Monitor equipment malfunctions<br>b. Non-monitor equipment malfunctions<br>c. Quality assurance calibration<br>d. Other known causes<br>e. Unknown causes<br><br>2. Total CEMS downtime<br><br>3. [ Total CEMS downtime / Total time source emitted X 100 = ] |
| | |

[1] For opacity, record all times in minutes. For gases, record all times in hours. Fractions are acceptable (e.g., 4.06 hours)

[2] CEMS downtime shall be regarded as any time CEMS is not measuring emissions.

Permit Analysis
Montana Megawatts I, LLC
Permit #3154-04

I. Introduction/Process Description

Montana Megawatts I, LLC (MMI) proposed a 262-megawatt (MW) natural gas-fired electrical power generation facility located in Section 30, Township 21 North, Range 4 East, approximately two miles north of the city of Great Falls, in Cascade County, Montana.

A. Permitted Equipment

The facility's primary equipment will consist of the following:

*Simple Cycle (up to two years)*

- Two simple cycle 80-MW natural gas turbines to produce electrical power. Each turbine is a General Electric PG7121EA gas turbine. Emissions of oxides of nitrogen ($NO_x$) and carbon monoxide (CO) will be controlled by dry low $NO_x$ combustors that are integral to the design of the turbines; and
- Emergency Water Pump (diesel-fired).

*Combined Cycle*

- Two combined cycle natural gas turbine systems to produce electrical power, each system consisting of:
  - 80-MW General Electric PG7121EA gas turbine, and
  - Heat recovery steam generator (HRSG) with a natural gas duct burner with a firing rate of 0.12 million standard cubic feet per hour (MMSCF/hr).
    - Emissions of $NO_x$ will be controlled by dry low $NO_x$ combustors that are integral to the design of the PG7121EA turbines and by selective catalytic reduction (SCR) units installed on each stack.
    - Emissions of CO will be controlled by a catalytic oxidizer.
- 102-MW steam turbine powered by the two HRSG units;
- 5-cell cooling tower; and
- Emergency Water Pump (diesel-fired).

B. Source Description

A gas turbine is an internal combustion engine that operates with rotary rather than reciprocating motion. Within each combustion turbine unit, a mixture of compressed air and natural gas is fired in the combustor to produce compressed hot combustion gases. Expansion of these gases in the turbine rotates the turbine shaft that turns a generator to produce electricity.

In stationary applications, the hot combustion gases are directed through one or more fan-like turbine wheels to generate shaft horsepower. A simple cycle turbine is the most basic operating cycle of a gas turbine, with thermal efficiency ranging from 15-42%. It functions with only three primary sections: a compressor, a combustor, and a turbine.

The compressor draws in ambient air and compresses it to a pressure of up to 30 times ambient pressure. The compressed air is then directed to the combustor section where fuel is introduced, ignited, and burned. The hot combustion gases are then diluted with additional cool air from the compressor section and directed to the turbine section. Energy is recovered in the turbine section in the form of shaft horsepower; typically greater than 50 percent of the horsepower is required to drive the internal compressor section. The balance of the recovered shaft energy is available to drive the external load unit. The compressor and turbine sections

can be a single fan-like wheel assembly, but are usually made up of a series of stages. The compressor and turbine sections may be associated with one or several connecting shafts. In a single shaft gas turbine, all compressor and turbine stages are fixed to a single continuous shaft and operate at the same speed. The single shaft configuration is typically used to drive electric generators.

The addition of an HRSG to the simple cycle turbine unit creates a combined cycle unit. Heat energy in the turbine exhaust gases is recovered by the HRSG to create steam. This steam energy is then converted to mechanical and electrical energy when it passes through a steam turbine generator unit. Additional heat for the creation of steam can be supplied by duct burners, which increase the turbine exhaust gas temperature. HRSG operation is not dependent upon the firing of the duct burners. The thermal efficiency of a combined cycle turbine is between 38-60%.

MMI's facility will consist of two combined cycle General Electric Model PG7121EA natural gas turbines and one steam turbine. The gas turbines are equipped with dry low $NO_x$ combustors, which are integral to the design. The nominal power output of these turbines is 80 MW. The facility is permitted to operate in this simple cycle mode for up to two years, until the combined cycle infrastructure is installed.

Under the combined cycle system, the facility will install additional equipment. The HRSG units, manufactured by Deltak, will be equipped with an SCR and a CO catalyst to further reduce potential $NO_x$ and CO emissions. The steam turbine has a gross power output of 102 MW. The nominal output power of the combined cycle facility is 262 MW.

The Department of Environmental Quality (Department) placed annual $NO_x$, CO, and Particulate Matter less than or equal to 10 microns ($PM_{10}$) limits in the permit to keep MMI below the New Source Review (NSR) and Title V threshold of 100 tons per year (tpy). MMI is required to track the $NO_x$ and CO emissions according to a rolling 12-month time period, using data taken from continuous emission monitors. MMI is also required to limit the hours of operation for the duct burners, to demonstrate compliance with the $PM_{10}$ limitation.

The Department placed short-term $NO_x$ and CO emission limits on the facility. The worst-case one hour $NO_x$ limit is based on stack test data for start-up at similar GE turbine stations, and represents the highest one-hour during a cold start, before the SCR unit is able to operate. The worst-case one hour CO limit is based on theoretical engineering calculations using climatic conditions for Montana. The Department also placed Best Available Control Technology (BACT) limits during normal operating conditions for $NO_x$, CO, $PM_{10}$, $SO_2$, and VOC.

C. Permit History

On October 12, 2001, NorthWestern was issued Permit **#3154-00** for the construction and operation of a nominal 160-MW power generation facility. The permitted facility consisted of two 80-MW General Electric PG7121EA simple cycle gas turbines. After issuance of the Department's Decision on this permit, the permit was appealed to the Board of Environmental Review. Prior to the hearing date scheduled for the NorthWestern appeal, NorthWestern reached a settlement with the appellants. The appellants agreed to drop their appeal if NorthWestern would commit to taking additional actions to counteract the emissions from this facility. NorthWestern agreed to the conditions, but the conditions were not included as part of Permit #3154-00. Instead, the settlement conditions represent an additional agreement between the appellants and NorthWestern.

On January 23, 2002, NorthWestern was issued Permit #3154-01 for the modification of Permit #3154-00. After issuance of the original permit, NorthWestern discovered that equipment modifications can be incorporated into the two turbines that will result in an equal or lower

amount of CO emissions, without the use of a CO catalyst. Based on the information that NorthWestern received regarding the equipment modifications, NorthWestern requested that the permit be modified to remove the requirement to install CO catalysts and that the existing emission limits remain the same. The Department agreed with the change and modified the permit to reflect the change. Permit **#3154-01** replaced Permit #3154-00.

On May 28, 2002, the Department received a request from NorthWestern to alter Permit #3154-01 for the potential to add an HRSG to each of the existing 80-MW natural gas-fired simple cycle combustion turbines. The addition of the HRSGs converts the simple cycle turbines into combined cycle systems. The exhaust heat generated from the simple-cycle turbines will produce steam, which will drive a steam turbine. NorthWestern anticipates an additional 102 MW of power generation from the installation of the two HRSGs and one steam turbine, for a total of 262 MW from the facility. Permit **#3154-02** replaced Permit #3154-01.

Based on comments during the preliminary determination comment period, the Department has included conditions to allow NorthWestern to operate simple cycle turbines while construction is in progress for the addition of the HRSG's and steam turbine. Once the combined cycle turbines are constructed and operating, Section II of this permit will no longer apply.

On September 24, 2004, the Department received a letter from NorthWestern requesting to modify Permit #3154-02 to change the company name from NorthWestern Montana First Megawatts, LLC to Montana Megawatts I. This permitting action included the name change and updated the permit to reflect current permit language and rule references used by the Department. Permit **#3154-03** replaced Permit #3154-02.

D. Current Permit Action

The Department received a letter dated August 7, 2005, from NorthWestern, requesting that the Department re-issue Montana Air Quality Permit (MAQP) #3154-03 for MMI.

The Department determined that a full preconstruction review was required since the three-year commencement of construction timeframe expired on August 10, 2005. The Department requested additional information in a letter dated September 22, 2005. On December 26, 2005, the Department received a revised permit application that included an updated BACT analysis. After further correspondence, the application was deemed complete on July 13, 2006. Permit **#3154-04** replaces Permit #3154-03.

The current permitting action allows MMI to operate two simple cycle gas turbines, each rated at 80-MW. Within two years, MMI is required to add additional equipment to convert the two simple cycle gas turbines into combined cycle gas turbines, for a total power production 262-MW.

E. Additional Information

Additional information, such as applicable rules and regulations, BACT/Reasonably Available Control Technology (RACT) determinations, air quality impacts, and environmental assessments, is included in the analysis associated with each change to the permit.

## II. Applicable Rules and Regulations

The following are partial explanations of some applicable rules and regulations that apply to the facility. The complete rules are stated in the Administrative Rules of Montana (ARM) and are available, upon request, from the Department. Upon request, the Department will provide references for location of complete copies of all applicable rules and regulations or copies where appropriate.

A. ARM 17.8, Subchapter 1 – General Provisions, including but not limited to:

1. ARM 17.8.101 Definitions. This rule includes a list of applicable definitions used in this chapter, unless indicated otherwise in a specific subchapter.

2. ARM 17.8.105 Testing Requirements. Any person or persons responsible for the emission of any air contaminant into the outdoor atmosphere shall, upon written request of the Department, provide the facilities and necessary equipment (including instruments and sensing devices) and shall conduct tests, emission or ambient, for such periods of time as may be necessary using methods approved by the Department. Based on emissions from the turbines, the Department determined that testing for $NO_x$, CO, and $PM_{10}$ is necessary.

3. ARM 17.8.106 Source Testing Protocol. The requirements of this rule apply to any emission source testing conducted by the Department, any source or other entity as required by any rule in this chapter, or any permit or order issued pursuant to this chapter, or the provisions of the Clean Air Act of Montana, 75-2-101, *et seq*., Montana Code Annotated (MCA).

   MMI shall comply with the requirements contained in the Montana Source Test Protocol and Procedures Manual, including, but not limited to, using the proper test methods and supplying the required reports. A copy of the Montana Source Test Protocol and Procedures Manual is available from the Department upon request.

4. ARM 17.8.110 Malfunctions. (2) The Department must be notified promptly by telephone whenever a malfunction occurs that can be expected to create emissions in excess of any applicable emission limitation or to continue for a period greater than four hours.

5. ARM 17.8.111 Circumvention. (1) No person shall cause or permit the installation or use of any device or any means that, without resulting in reduction of the total amount of air contaminant emitted, conceals or dilutes an emission of air contaminant that would otherwise violate an air pollution control regulation. (2) No equipment that may produce emissions shall be operated or maintained in such a manner as to create a public nuisance.

B. ARM 17.8, Subchapter 2 – Ambient Air Quality, including, but not limited to the following:

1. ARM 17.8.204 Ambient Air Monitoring
2. ARM 17.8.210 Ambient Air Quality Standards for Sulfur Dioxide
3. ARM 17.8.211 Ambient Air Quality Standards for Nitrogen Dioxide
4. ARM 17.8.212 Ambient Air Quality Standards for Carbon Monoxide
5. ARM 17.8.213 Ambient Air Quality Standard for Ozone
6. ARM 17.8.214 Ambient Air Quality Standard for Hydrogen Sulfide
7. ARM 17.8.220 Ambient Air Quality Standard for Settled Particulate Matter
8. ARM 17.8.221 Ambient Air Quality Standard for Visibility
9. ARM 17.8.222 Ambient Air Quality Standard for Lead
10. ARM 17.8.223 Ambient Air Quality Standard for $PM_{10}$

MMI must maintain compliance with the applicable ambient air quality standards.

C. ARM 17.8, Subchapter 3 – Emission Standards, including, but not limited to:

1. ARM 17.8.304 Visible Air Contaminants. This rule requires that no person may cause or authorize emissions to be discharged into an outdoor atmosphere from any source installed after November 23, 1968, that exhibit an opacity of 20% or greater averaged over six consecutive minutes.

2. ARM 17.8.308 Particulate Matter, Airborne. (1) This section requires an opacity limitation of 20% for all fugitive emission sources and that reasonable precautions be taken to control emissions of airborne particulate. (2) Under this section, MMI shall not cause or authorize the use of any street, road, or parking lot without taking reasonable precautions to control emissions of airborne particulate matter.

3. ARM 17.8.340 Standard of Performance for New Stationary Sources. This section incorporates, by reference, 40 CFR Part 60, Standards of Performance for New Stationary Sources (NSPS). MMI's combined cycle turbines are considered NSPS affected facilities under 40 CFR Part 60 and are subject to the requirements of the following subparts:

   - 40 CFR Part 60, Subpart Db Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units. This subpart does not apply to either of the duct burners because they are subject to Subpart KKKK. Otherwise, the duct burners would be subject to Subpart Db because they are over 100 million British thermal units per hour (MMBTU/hr) and constructed since June 19, 1984.

   - 40 CFR Part 60, Subpart GG Standards of Performance for Stationary Gas Turbines. This subpart does not apply to either of the combined cycle turbines because the turbines are subject to Subpart KKKK. Otherwise, the turbines would be subject to Subpart GG because they were constructed after October 3, 1977, and because the turbines will have a heat input capacity of greater than 10.7 gigajoules per hour.

   - 40 CFR Part 60, Subpart KKKK Standards of Performance for Stationary Combustion Turbines. This subpart applies to both the combined cycle turbine units (including duct burners) because they are stationary combustion turbines with a heat input at peak load equal to or greater than 10 MMBTU/hr that commenced construction, modification, or reconstruction after February 18, 2005.

4. ARM 17.8.341 Emission Standards for Hazardous Air Pollutants. This section incorporates, by reference, 40 CFR Part 61, National Emission Standards for Hazardous Air Pollutants (NESHAP). Since the emission of Hazardous Air Pollutants (HAP) from the MMI power generation facility is less than 10 tons per year for any individual HAP and less than 25 tons per year for all HAP combined, the MMI facility is not subject to the provisions of 40 CFR Part 61.

5. ARM 17.8.342 Emission Standards for Hazardous Air Pollutants for Source Categories. This section incorporates, by reference, 40 CFR Part 63, NESHAP for Source Categories. When the emission of HAP from a facility is less than 10 tons per year for any individual HAP and less than 25 tons per year for all HAP combined, the facility is not subject to the provisions of 40 CFR Part 63. Therefore, since the emission of HAP from the MMI power generation facility is less than 10 tons per year for any individual HAP and less than 25 tons per year for all HAP combined, the facility will not be subject to any of these standards, including:

- 40 CFR Part 63, Subpart Q Standards of Performance for Industrial Process Cooling Towers. This subpart applies to all new and existing Industrial Process Cooling Towers (IPCT) at major sources, that are operated with chromium-based water treatment chemicals on or after September 8, 1994. The regulation states that no owner or operator shall use chromium-based water treatment chemicals in an IPCT. MMI does not intend to use chromium-based water treatment chemicals in the cooling tower water. Furthermore, MMI is not a major source of HAPs, and as such is not subject to this regulation.

D. ARM 17.8, Subchapter 5 – Air Quality Permit Application, Operation, and Open Burning Fees, including, but not limited to:

1. ARM 17.8.504 Air Quality Permit Application Fees. This rule requires that an applicant submit an air quality permit application fee concurrent with the submittal of an air quality permit application. A permit application is incomplete until the proper application fee is paid to the Department. MMI submitted the appropriate permit application fee for the current permit action.

2. ARM 17.8.505 Air Quality Operation Fees. An annual air quality operation fee must, as a condition of continued operation, be submitted to the Department by each source of air contaminants holding an air quality permit (excluding an open burning permit) issued by the Department. The air quality operation fee is based on the actual or estimated actual amount of air pollutants emitted during the previous calendar year.

   An air quality operation fee is separate and distinct from an air quality permit application fee. The annual assessment and collection of the air quality operation fee, described above, shall take place on a calendar-year basis. The Department may insert into any final permit issued after the effective date of these rules, such conditions as may be necessary to require the payment of an air quality operation fee on a calendar-year basis, including provisions that prorate the required fee amount.

E. ARM 17.8, Subchapter 7 – Permit, Construction, and Operation of Air Contaminant Sources, including, but not limited to:

1. ARM 17.8.740 Definitions. This rule is a list of applicable definitions used in this chapter, unless indicated otherwise in a specific subchapter.

2. ARM 17.8.743 Montana Air Quality Permits--When Required. This rule requires a person to obtain an air quality permit or permit alteration to construct, alter, or use any air contaminant sources that have the Potential to Emit (PTE) greater than 25 tons per year of any pollutant. MMI has a PTE greater than 25 tons per year of particulate matter (PM), $PM_{10}$, $NO_x$, and CO; therefore, an air quality permit is required.

3. ARM 17.8.744 Montana Air Quality Permits--General Exclusions. This rule identifies the activities that are not subject to the Montana Air Quality Permit program.

4. ARM 17.8.745 Montana Air Quality Permits--Exclusion for De Minimis Changes. This rule identifies the de minimis changes at permitted facilities that do not require a permit under the Montana Air Quality Permit Program.

5. ARM 17.8.748 New or Modified Emitting Units--Permit Application Requirements. (1) This rule requires that a permit application be submitted prior to installation, alteration, or use of a source. MMI submitted the required permit application for the current permit action. (7) This rule requires that the applicant notify the public by means of legal

publication in a newspaper of general circulation in the area affected by the application for a permit. MMI submitted an affidavit of publication of public notice for the December 30, 2005, issue of the *Great Falls Tribune*, a newspaper of general circulation in the town of Great Falls in Cascade County, as proof of compliance with the public notice requirements.

6. ARM 17.8.749 Conditions for Issuance or Denial of Permit. This rule requires that the permits issued by the Department must authorize the construction and operation of the facility or emitting unit subject to the conditions in the permit and the requirements of this subchapter. This rule also requires that the permit must contain any conditions necessary to assure compliance with the Federal Clean Air Act (FCAA), the Clean Air Act of Montana, and rules adopted under those acts.

7. ARM 17.8.752 Emission Control Requirements. This rule requires a source to install the maximum air pollution control capability that is technically practicable and economically feasible, except that BACT shall be utilized. The BACT analysis is discussed in Section III of this permit analysis.

8. ARM 17.8.755 Inspection of Permit. This rule requires that air quality permits shall be made available for inspection by the Department at the location of the source.

9. ARM 17.8.756 Compliance with Other Requirements. This rule states that nothing in the permit shall be construed as relieving MMI of the responsibility for complying with any applicable federal or Montana statute, rule, or standard, except as specifically provided in ARM 17.8.740, *et seq*.

10. ARM 17.8.759 Review of Permit Applications. This rule describes the Department's responsibilities for processing permit applications and making permit decisions on those permit applications that do not require the preparation of an environmental impact statement.

11. ARM 17.8.762 Duration of Permit. An air quality permit shall be valid until revoked or modified, as provided in this subchapter, except that a permit issued prior to construction of a new or altered source may contain a condition providing that the permit will expire unless construction is commenced within the time specified in the permit, which in no event may be less than one year after the permit is issued.

12. ARM 17.8.763 Revocation of Permit. An air quality permit may be revoked upon written request of the permittee, or for violations of any requirement of the Clean Air Act of Montana, rules adopted under the Clean Air Act of Montana, the FCAA, rules adopted under the FCAA, or any applicable requirement contained in the Montana State Implementation Plan (SIP).

13. ARM 17.8.764 Administrative Amendment to Permit. An air quality permit may be amended for changes in any applicable rules and standards adopted by the Board of Environmental Review (Board) or changed conditions of operation at a source or stack that do not result in an increase of emissions as a result of those changed conditions. The owner or operator of a facility may not increase the facility's emissions beyond permit limits unless the increase meets the criteria in ARM 17.8.745 for a de minimis change not requiring a permit, or unless the owner or operator applies for and receives another permit in accordance with ARM 17.8.748, ARM 17.8.749, ARM 17.8.752, ARM 17.8.755, and ARM 17.8.756, and with all applicable requirements in ARM Title 17, Chapter 8, Subchapters 8, 9, and 10.

14. ARM 17.8.765 Transfer of Permit. This rule states that an air quality permit may be transferred from one person to another if written notice of Intent to Transfer, including the names of the transferor and the transferee, is sent to the Department.

F. ARM 17.8, Subchapter 8 – Prevention of Significant Deterioration of Air Quality, including, but not limited to:

1. ARM 17.8.801 Definitions. This rule is a list of applicable definitions used in this subchapter.

2. ARM 17.8.818 Review of Major Stationary Sources and Major Modifications--Source Applicability and Exemptions. The requirements contained in ARM 17.8.819 through ARM 17.8.827 shall apply to any major stationary source and any major modification, with respect to each pollutant subject to regulation under the FCAA that it would emit, except as this subchapter would otherwise allow.

The facility is a "listed facility" and the Prevention of Significant Deterioration (PSD) threshold is 100 tons per year for a major stationary source. Due to the proposed limitations, the facility does not have the potential to emit more than 100 tons per year of any criteria pollutant. Therefore, the MMI facility is not deemed a major stationary source and is not subject to review under the PSD program. Based on this proposal, the Department added limits to Permit #3154-04 that keep the potential $NO_x$, CO, PM and $PM_{10}$ emissions to less than 100 tons per rolling 12-month time period.

G. ARM 17.8, Subchapter 12 – Operating Permit Program Applicability, including, but not limited to:

1. ARM 17.8.1201 Definitions. (23) Major Source under Section 7412 of the FCAA is defined as any source having:

a. PTE > 100 tons per year of any pollutant;

b. PTE > 10 tons per year of any one HAP, PTE > 25 tons per year of a combination of all HAPs, or lesser quantity as the Department may establish by rule; or

c. PTE > 70 tons per year of $PM_{10}$ in a serious $PM_{10}$ nonattainment area.

2. ARM 17.8.1204 Air Quality Operating Permit Program. (1) Title V of the FCAA amendments of 1990 requires that all sources, as defined in ARM 17.8.1204(1), obtain a Title V Operating Permit. In reviewing and issuing Air Quality Permit #3154-04 for MMI, the following conclusions were made:

a. The facility's PTE, after control, is less than 100 tons per year for any pollutant.

b. The facility's PTE is less than 10 tons per year for any one HAP and less than 25 tons per year for all HAPs.

c. This source is not located in a serious $PM_{10}$ nonattainment area.

d. This facility is subject to a current NSPS standard (40 CFR 60, Subpart KKKK).

e. This facility is not subject to a current NESHAP standard.

f. This source is a Title IV affected source.

g. This source is not an EPA designated Title V source.

h. As allowed by ARM 17.8.1204(3), the Department may exempt a source from the requirement to obtain an air quality operating permit by establishing federally enforceable limitations which limit that source's PTE.

i. In applying for an exemption under this section, the owner or operator of the source shall certify to the Department that the source's PTE does not require the source to obtain an air quality operating permit.

ii. Any source that obtains a federally enforceable limit on PTE shall annually certify that its actual emissions are less than those that would require the source to obtain an air quality operating permit.

MMI has taken federally enforceable permit limits to keep potential emissions below major source permitting thresholds. Therefore, the facility is not a major source and, thus a Title V operating permit is not required.

The Department determined that the annual reporting requirements contained in the permit are sufficient to satisfy this requirement. However, if minor sources subject to NSPS are required to obtain a Title V Operating Permit, MMI will be required to obtain a Title V Operating Permit.

3. ARM 17.8.1207 Certification of Truth, Accuracy, and Completeness. MMI shall annually certify that its actual emissions are less than those that would require the source to obtain an air quality operating permit as required by ARM 17.8.1204 (3)(b). The annual certification shall comply with requirements of ARM 17.8.1207. The annual certification shall be submitted along with the annual emission inventory information.

III. BACT Determination

A BACT determination is required for each new or altered source. MMI shall install on the new or altered source the maximum air pollution control capability which is technically practicable and economically feasible, except that BACT shall be utilized.

*Combined Cycle*

A. $NO_x$ BACT

$NO_x$ will be formed during the combustion of natural gas in the combined cycle turbine units. Most $NO_x$ is formed in the high temperature flame zone near the burners. Maximum $NO_x$ production occurs at a slightly lean fuel-to-air ratio due to the excess availability of oxygen.

The BACT analysis included Dry Low $NO_x$ (DLN), Selective Catalytic Reduction (SCR), wet controls, and innovative catalytic systems (SCONOX™ and XONON). A summary of the analysis of these controls is shown below:

1. Dry Low NOx (No additional control)

General Electric turbine technology includes DLN combustion systems as part of the design.

In general, DLN combustion systems reduce $NO_x$ formation by controlling the mixing of fuel and air to provide low excess air firing or off-stoichiometric combustion. These technologies incorporate multiple stage combustion systems that may include premixing,

fuel rich zones that reduce the amount of $O_2$ available for $NO_x$ production, fuel lean zones that control $NO_x$ production through lower combustion temperatures, or some combination of these techniques. DLN typically reduces $NO_x$ by approximately 75%. The GE turbines' DLN technology will reduce $NO_x$ emissions to 9 parts per million, volume basis (ppmv), which is equivalent to an average $NO_x$ emission rate of 29.4 lb/hr or a maximum emission rate of 34.9 lb/hr, depending on temperature.

Almost all frame gas turbines presently being manufactured incorporate these technologies into the combustor design. Therefore, DLN is considered as the base for $NO_x$ control for the turbines. The duct burners do not employ DLN.

2. SCR

SCR is a post-combustion gas treatment technique for reduction of nitric oxide (NO) and nitrogen dioxide ($NO_2$) in the engine exhaust stream to molecular nitrogen, water, and oxygen. In the SCR process, aqueous or anhydrous ammonia ($NH_3$) or urea is used as a reducing agent, and is injected into the flue gas upstream of the catalyst bed. $NO_x$ and $NH_3$ combine at the catalyst surface, forming an ammonium salt intermediate that subsequently decomposes to produce elemental nitrogen and water.

SCR works best for flue gas temperatures between 400°F and 800°F, when a minimum amount of $O_2$ is present. Use of a zeolite catalyst can extend the upper range of this window to a maximum of 1100ºF. Typically, a metal-based catalyst is employed in a combined cycle application, where it is installed within the heat recovery steam generator. The catalyst and catalyst housing tend to be very large and contain a large amount of surface area. The SCR system is usually operated in conjunction with other technologies. Disposal of spent catalyst must be considered. Unlike zeolite and precious metal catalysts, base metal catalysts constitute hazardous waste. Furthermore, SCR can result in additional air emissions, such as ammonia.

The expected control efficiency for SCR is typically between 60% - 90%. As calculated as part of the BACT analysis, the cost effectiveness of installing an SCR is above the industry norm. An SCR unit would cost approximately $12,684 per ton of $NO_x$ removed, based on removal of 78% of the 174 tpy potential $NO_x$ emissions after DLN burners.

The Environmental Protection Agency's RACT-BACT-LAER Clearinghouse (RBLC) showed recent $NO_x$ BACT determinations ranging from 2 to 9 ppmv. MMI proposes DLN for the turbines and SCR to control $NO_x$ from both the turbines and the HRSG units as BACT during operation in the combined cycle mode. This dual control system will achieve a $NO_x$ exhaust concentration of 2.5 ppmv or less, which is equivalent to (depending upon temperature) an average steady-state $NO_x$ emission rate of 8.2 lb/hr for the turbines alone or 9.3 lb/hr for the turbines with duct burners, or a maximum steady-state NOx emission rate of 9.7 lb/hr for either scenario. In addition, this control system will help to keep the emissions of $NO_x$ from this facility below the 100 tons per year threshold for both NSR and Title V.

3. Wet Controls

Water or steam injection technology can suppress $NO_x$ emissions from gas turbines. The injected fluid increases the thermal mass by dilution and thereby reduces peak temperatures in the flame zone. Water purity is essential to control erosion and the formation of deposits in the hot section of the turbine. All manufacturers offer water injection systems, but not all offer a steam injection system. Steam would be generally supplied by the HRSG.

$NO_x$ reduction efficiency increases as the water-to-fuel ratio increases. For maximum efficiency, the water must be atomized and injected with homogeneous mixing throughout the combustor. This technique reduces the thermal $NO_x$, but may actually increase the production of fuel $NO_x$. CO and VOC emissions are increased while using water injection. Wet injection can lower uncontrolled NOx emissions to a minimum of 25 ppmv. The percent reduction depends on the uncontrolled levels of NO, but may reduce $NO_x$ by 60% or more.

DLN will reduce $NO_x$ to 9 ppmv; therefore, wet controls cannot provide any additional emission reduction. Since the GE turbines have built-in DLN technology, the Department determined that wet controls do not constitute BACT in this case.

4. Innovative Catalytic Systems

Innovative catalytic technologies (SCONOX and XONON) integrate catalytic oxidation and absorption technology. In the SCONOX process, CO and NO are catalytically oxidized to $CO_2$ and $NO_x$; the $NO_2$ molecules are subsequently absorbed on the treated surface of the SCONOX catalyst.

The XONON system is applicable to diffusion and lean-premix combustors. It utilizes a flameless combustion system where fuel and air react on a catalyst surface, preventing the formation of $NO_x$ while achieving low CO levels. The overall combustion system consists of the partial combustion of the fuel in the catalyst module followed by completion of combustion downstream of the catalyst. Initial partial combustion produces no $NO_x$ and downstream combustion occurs in a flameless homogeneous reaction that produces almost no $NO_x$. The system is totally contained within the combustor and is not an add-on process for clean up of the turbine exhaust.

The SCONOX and XONON technologies have only been proven on smaller generation units (<44MW). Due to the questions on the effectiveness of using this control technology for larger generation units and the overall cost of using this technology in comparison to the base case, the Department determined that innovative catalytic systems do not constitute BACT in this case.

*Conclusion*

The RBLC showed that recent $NO_x$ BACT determinations range from 2 to 9 ppmv. MMI proposed DLN for the turbines, as well as SCR to control $NO_x$ from both the turbines and the HRSG units during operation in combined cycle mode. This combined control system will achieve an overall control efficiency of more than 80% with an average $NO_x$ exhaust concentration of 2.5 ppmv or less. This is equivalent to (depending upon temperature) an average steady-state NOx emission rate of 8.2 lb/hr for the turbines alone or 9.3 lb/hr for the turbines with duct burners, or a maximum steady-state NOx emission rate of 9.7 lb/hr for either scenario. Although the cost exceeds what is typically required for BACT, MMI has proposed to install the SCR to keep the emissions of NOx from this facility below the 100 tons per year threshold for NSR.

B. CO BACT

CO emissions result from the incomplete oxidation of carbon-based fuels. Control technologies are based on completing the oxidation process. The BACT analysis included oxidation (thermal and catalytic) and proper design and combustion for the turbine. A summary of the analysis of these controls is shown below.

1. Oxidation

Oxidation controls ideally break down the molecular structure of an organic compound into $CO_2$ and water vapor. Temperature, residence time, and turbulence of the system affect CO control efficiency. Incinerators or oxidizers have the potential for very high CO control efficiency; however, this efficiency comes at the expense of potentially increasing $NO_x$ production. Catalytic and thermal oxidizer units are expected to have CO control efficiencies ranging from 70% - 90%.

A thermal incinerator operates at temperatures ranging between 1450°F and 1600°F. Due to the high temperatures required for complete destruction, fuel costs can be expensive and fuel consumption can be excessive with oxidation units. To lower fuel usage, regenerative thermal oxidizers (RTO's) or catalytic oxidizers can be used to preheat contaminated process air in a heat recovery chamber. Catalytic incineration is similar to thermal incineration; however, catalytic incineration allows for oxidation at temperatures ranging from 600°F to 1000 °F. The catalyst systems that are used are typically metal oxides such as nickel oxide, copper oxide, manganese oxide, or chromium oxide. No additional fuel is required for the catalytic oxidizer, although electricity is required.

The cost effectiveness of catalytic oxidation is approximately $3,492 per ton, and the cost effectiveness of a thermal oxidizer was calculated at $33,793 per ton. The RBLC database shows that an oxidation catalyst is BACT for CO with emissions ranging from 2 to 18 ppmv. MMI has proposed DLN burners and oxidation catalysts that will achieve a CO exhaust concentration of 5 ppmv, average.

2. No Additional Control

No additional control would involve using proper combustion practices to minimize the CO emissions. As part of the base case, the GE turbines are designed with DLN combustors that are expected to control CO to 9 ppmv.

*Conclusion*

The RBLC database shows that an oxidation catalyst is BACT for CO with emissions ranging from 2 to 18 ppmv. MMI has proposed DLN burners and oxidation catalysts that will achieve a CO exhaust concentration of 5 ppmv, average, which is equivalent to (depending on temperature) an average CO emission rate of 9.9 lb/hr for the turbines alone or 11.3 lb/hr for the turbines with duct burners, or a maximum CO emission rate of 11.8 lb/hr for either scenario. Although the cost exceeds what is typically required for BACT, MMI has proposed to install an oxidation catalyst to keep the emissions of CO from this facility below the 100 tons per year threshold for NSR.

C. Particulate Matter/$PM_{10}$ BACT

1. Electrostatic Precipitator (ESP)

An ESP uses electric forces to move particles out of a gas stream and on to collection plates. The particles are given an electric charge by forcing them to pass through the corona that surrounds a highly charged electrode, usually a wire. The electrical field then forces the charged particles to the opposite charged electrode, usually a plate. Solid particles are removed from the collection electrode by a shaking process.

Except for a type of ESP known as plate wire precipitator, ESPs are designed to handle relatively low volumes of gas. Even with the plate wire precipitator, there are technical problems for controlling relatively clean gas streams, such as the turbine units would discharge. An ESP is not a technically feasible control device for natural gas-fired turbines. This option has been eliminated.

2. Fabric Filter (Baghouse)

Baghouses consist of one or more isolated compartments containing rows of fabric filter bags or tubes. The gas stream passes through the fabric filter, where particulate is retained on the upstream face of the bags, while the cleaned gas stream is vented to the atmosphere or to another pollution control device. Baghouses can have high collection efficiencies, in excess of 99%.

Baghouses typically operate at gas temperatures up to 550 degrees F. While bags can be obtained that are capable of handling such a high temperature gas, the cost effectiveness of installing a baghouse with the appropriate bags is cost prohibitive at $31,228/ton. For these reasons, a baghouse does not constitute BACT for control of particulate emissions from the turbines.

3. Wet Scrubber

Wet scrubbers typically use water to impact, intercept, or diffuse a particulate-laden gas stream. With impaction, particulate matter is accelerated and impacted onto a surface area or into a liquid droplet through devices such as venturis and spray chambers. Using interception, particles flow nearly parallel to the water droplets that allow the water to intercept the particles. Diffusion is used for particles smaller than 0.5 microns and where there is a high temperature difference between the gas and the scrubbing liquid.

Using a wet scrubber would result in additional environmental concerns, most notably, the large volume of water used and wastewater discharged from the process. Furthermore, small particles with limited inertial energy which are insoluble, such as the emissions from the turbines, cannot be collected efficiently by this technology. Collection of small particles requires a large pressure drop across the scrubber, which greatly reduces the efficiency of the turbine. For these reasons, a wet scrubber does not constitute BACT for particulate emissions from the turbines.

4. No Additional Control

The high volumetric flow rate of gas through the turbines, with relatively low particulate loading, makes the total annual cost of control equipment cost prohibitive. For these reasons, the use of "no additional control" will constitute BACT for the turbines.

D. VOC BACT

VOC emissions from MMI are relatively minor (10.9 tpy each unit, 21.8 tpy facility-wide). Furthermore, CO control also functions to serve as VOC control. The RBLC database shows VOC emissions of 4 ppmv are typical. MMI has proposed DLN burners and oxidation catalysts that will achieve a VOC exhaust concentration of 2 to 4 ppmv, depending upon temperature. This is equivalent to an average VOC emission rate (depending on temperature) of 2.3 lb/hr for the turbines alone or 2.6 lb/hr for the turbines with duct burners, or a maximum VOC emission rate of 2.7 lb/hr. Installation of DLN burners and oxidation catalysts on the combined cycle/HRSG stacks constitute BACT.

E. $SO_2$ BACT

$SO_2$ emissions from MMI are relatively minor (5.7 tpy each unit, 11.4 tpy facility-wide). MMI proposed no additional control (combusting only pipeline quality natural gas) as BACT. Due to the low amount of $SO_2$ emitted from the facility, control equipment would be cost prohibitive. Therefore, the Department concurs with MMI's proposal and determined that no additional control (combusting only pipeline quality natural gas) constitutes BACT. This is similar to other recent BACT determinations.

*Simple Cycle*

The Department conducted a BACT analysis for the two turbines in simple cycle mode. The following factors were considered for this part of the review:

- MMI proposed to operate the facility as simple cycle for a limited time until the facility is upgraded into combined cycle. The permit limits the facility's operation as simple cycle to no more than two years.
- The two simple cycle turbines will be operated for no more than 5,000 hours per year, combined, in order to restrict emissions below 100 tpy of every pollutant; and
- The turbines' DLN burners are integral to the unit and will function to limit both $NO_x$ and CO. Specifically, during steady-state the GE turbines burners will emit no more than:
  - 9 ppmv of $NO_x$ which is equivalent (based on temperature) to an average emission rate of 29.4 lb/hr or a maximum emission rate of 34.9 lb/hr;
  - 9 ppmv of CO which is equivalent (based on temperature) to an average emission rate of 17.9 lb/hr or a maximum emission rate of 21.3 lb/hr; and
  - 7.3 ppm VOC which is equivalent (based on temperature) to an average emission rate of 8.0 lb/hr or a maximum emission rate of 9.5 lb/hr.

Based on the above information, the Department determined that low $NO_x$ burners constitute BACT for the simple cycle scenario.

F. Emergency Water Pump BACT

The diesel-fired emergency water pump is limited to 500 hours of operation per year. The emissions for all the criteria pollutants are less than one ton per year. Any additional controls would be cost-prohibitive. Therefore, further BACT analysis is not required for the emergency pump.

G. Cooling Tower BACT

The cooling tower provides direct contact between the cooling water and the air passing through the tower; therefore, some of the cooling water becomes entrained in the air stream and is carried out of the tower as "drift" droplets. When the drift droplets evaporate, dissolved solids can crystallize and create $PM_{10}$ emissions.

For this project, the total liquid drift rate is assumed to be 0.002 percent of the circulating water flow. This drift is achieved by using high efficiency drift eliminators. Based on the maximum circulating flow rate of 64,453 gallons per minute and design total dissolved solids concentration of 1,488 mg/liter, the total amount of $PM_{10}$ emissions calculated using this drift is 4.2 tons per year. This annual emissions rate was calculated based on the assumption that all total dissolved solids in drift water are converted to $PM_{10}$, which overestimates the actual $PM_{10}$ emissions. Since the actual $PM_{10}$ emissions are relatively small, any additional controls would be cost prohibitive, and the high efficiency drift eliminator with a 0.002% drift rate is assumed BACT. This determination is consistent with other recent BACT determinations.

## IV. Emission Inventory

**SIMPLE CYCLE**

| Source | Ton/Year PM/$PM_{10}$ | $NO_x$ | CO | VOC | $SO_x$ |
|---|---|---|---|---|---|
| GE 7EA 80-MW Gas Turbine #1 | 12.50 | 49.17 | 43.45 | 10.09 | 1.51 |
| GE 7EA 80-MW Gas Turbine #2 | 12.50 | 49.17 | 43.45 | 10.09 | 1.51 |
| Diesel Fire Pump (265-brake horsepower (BHP)) | 0.01 | 0.98 | 0.04 | 0.03 | 0.14 |
| Totals | 25.01 | 99.31 | 86.94 | 20.22 | 3.16 |

*Turbines limited to 5000 hrs/yr combined, for up to 2-years
**Diesel Fire pump limited to 500 hr/yr

**COMBINED CYCLE**

| Source | Ton/Year PM/$PM_{10}$ | $NO_x$ | CO | VOC | $SO_x$ |
|---|---|---|---|---|---|
| GE 7EA 80-MW Gas Turbine #1 w/duct burner | 47.46 | 39.10 | 47.62 | 10.92 | 5.69 |
| GE 7EA 80-MW Gas Turbine #2 w/duct burner | 47.46 | 39.10 | 47.62 | 10.92 | 5.69 |
| Diesel Fire Pump (265-brake horsepower (BHP)) | 0.01 | 0.98 | 0.04 | 0.03 | 0.14 |
| Cooling Tower | 4.20 | -- | -- | -- | -- |
| Totals | 99.13 | 79.18 | 95.28 | 21.87 | 11.52 |

(SOURCES #01 & #02)
**Simple Cycle** GE 7EA 80 MW Gas Turbine (2 Turbines)
Size = 80 MW
Hours of Operation = 5,000 hr/yr combined turbine
Hours of Typical Operation = 2,240 hr/yr each turbine
Hours of Startup Operation = 260 hr/yr each turbine

$NO_x$ Emissions
Typical Operation
Emission Factor: 29.39 lb/hr {Manufacturer's Guarantee of 9 ppm $NO_x$ @ 15% $O_2$}
Calculations: 29.39 lb/hr * 2240 hr/yr * 0.0005 ton/lb = 32.92 ton/yr
Startup Operation
Emission Factor : 125 lb/hr {Manufacturer's Stack Test Info}
Calculations: 125 lb/hr * 260 hr/yr * 0.0005 ton/lb = 16.25 ton/yr
TOTAL NOx:
32.92 ton/yr typical operations + 16.25 ton/yr startup = 49.17 ton/yr

CO Emissions
Typical Operation
Emission Factor : 17.9 lb/hr {Manufacturer's Guarantee of 9 ppm CO @ 15% $O_2$}
Calculations: 17.9 lb/hr * 2240 hr/yr * 0.0005 ton/lb = 20.05 ton/yr
Startup Operation
Emission Factor : 180 lb/hr {Manufacturer's Stack Test Info}
Calculations: 180 lb/hr * 260 hr/yr * 0.0005 ton/lb = 23.40 ton/yr
TOTAL CO:
20.05 ton/yr typical operations + 23.40 ton/yr startup = 43.45 ton/yr

VOC Emissions
Typical Operation
Emission Factor : 7.95 lb/hr {Manufacturer's Info}
Calculations: 7.95 lb/hr * 2300 hr/yr * 0.0005 ton/lb = 9.14 ton/yr
Worst-Case Operation
Emission Factor : 9.45 lb/hr {Manufacturer's Info}
Calculations: 9.45 lb/hr * 200 hr/yr * 0.0005 ton/lb = 0.95 ton/yr
TOTAL VOC:
9.14 ton/yr typical operations + 0.95 ton/yr worst-case = 10.09 ton/yr

$SO_2$ Emissions
Emission Factor: 1.314 lb $SO_2$/MMSCF {MMI Info}
Typical Operation
Firing Rate: 0.904 MMSCF/hr average
Calculations: 1.314 lb SO2/MMSCF * 0.904 MMSCF* 2300 hr/yr * 0.0005 ton/lb = 1.366 ton/yr

Worst-Case Operation
Firing Rate: 1.074 MMSCF/hr average
Calculations: 1.314 lb SO2/MMSCF * 1.074 MMSCF* 200 hr/yr * 0.0005 ton/lb = 0.14 ton/yr
TOTAL $SO_2$:
1.366 ton/yr typical operations + 0.14 ton/yr worst-case = 1.51 ton/yr

$PM/PM_{10}$ Emissions
Emission Factor: 10.0 lb/hr {Manufacturer's Information}
Calculations: 10.0 lb/hr * 2500 hr/yr * 0.0005 ton/lb = 12.50 ton/yr

(SOURCES #01 & #02)
**Combined Cycle** GE 7EA 80 MW Gas Turbine plus HRSG unit duct burner (2 systems)
Size = 131 MW (80 MW turbine + 50% 102 MW steam generator)
Hours of Operation =
Turbines 8,760 hr/yr each
Duct Burners 12,000 hr/yr combined (show 6,000 hrs/yr per DB for calculations)

$NO_x$ Emissions (DLN and SCR):
Typical Operation with Duct Burner
Emission Factor : 9.28 lb/hr {Manufacturer's Guarantee of 2.5 ppm NOx @ 15% $O_2$}
Calculations: 9.28 lb/hr * 6,000 hr/yr * 0.0005 ton/lb = 27.84 ton/yr
Turbine w/o Duct Burner
Emission Factor : 8.16 lb/hr {Manufacturer's Guarantee of 2.5 ppm NOx @ 15% $O_2$}
Calculations: 8.16 lb/hr * 2,760 hr/yr * 0.0005 ton/lb = 11.26 ton/yr
TOTAL NOx:
27.84 ton/yr typical operations + 11.26 ton/yr turbine only = 39.10 ton/yr

CO Emissions (DLN and SCR):
Typical Operation with Duct Burner
Emission Factor : 11.30 lb/hr {Manufacturer's Guarantee of 2.5 ppm CO @ 15% $O_2$}
Calculations: 11.30 lb/hr * 6,000 hr/yr * 0.0005 ton/lb = 33.90 ton/yr
Turbine w/o Duct Burner
Emission Factor : 9.94 lb/hr {Manufacturer's Guarantee of 2.5 ppm CO @ 15% $O_2$}
Calculations: 9.94 lb/hr * 2,760 hr/yr * 0.0005 ton/lb = 13.72 ton/yr
TOTAL CO:
33.90 ton/yr typical operations + 13.72 ton/yr turbine only = 47.62 ton/yr

VOC Emissions (DLN and SCR):
Typical Operation with Duct Burner
Emission Factor : 2.59 lb/hr {Manufacturer's Information}
Calculations: 2.59 lb/hr * 6,000 hr/yr * 0.0005 ton/lb = 7.77 ton/yr
Turbine w/o Duct Burner
Emission Factor : 2.28 lb/hr {Manufacturer's Information}
Calculations: 2.28 lb/hr * 2,760 hr/yr * 0.0005 ton/lb = 3.15 ton/yr
TOTAL VOC:
7.77 ton/yr typical operations + 3.15 ton/yr turbine only = 10.92 ton/yr

$SO_2$ Emissions:
Typical Operation with Duct Burner
Emission Factor : 1.35 lb/hr {Manufacturer's Information}
Calculations: 1.35 lb/hr * 6,000 hr/yr * 0.0005 ton/lb = 4.05 ton/yr
Turbine w/o Duct Burner
Emission Factor : 1.19 lb/hr {Manufacturer's Information}
Calculations: 1.19 lb/hr * 2,760 hr/yr * 0.0005 ton/lb = 1.64 ton/yr
TOTAL $SO_2$:
4.05 ton/yr typical operations + 1.64 ton/yr turbine only = 5.69 ton/yr

PM/PM10 Emissions:
Typical Operation with Duct Burner
Emission Factor: 11.22 lb/hr {Manufacturer's Information}
Calculations: 11.22 lb/hr * 6,000 hr/yr * 0.0005 ton/lb = 33.66 ton/yr
Turbine w/o Duct Burner
Emission Factor: 10.0 lb/hr {Manufacturer's Information}
Calculations: 10.0 lb/hr * 2,760 hr/yr * 0.0005 ton/lb = 13.8 ton/yr
TOTAL PM/PM10:
33.66 ton/yr typical operations + 13.8 ton/yr turbine only = 47.46 ton/yr

(SOURCE #03)
John Deere Diesel-fired Emergency Water Pump

Size = 265 hp
Hours of Operation 500 hr/yr

$PM/PM_{10}$ Emissions
Emission Factor: 0.000155 lb/hp-hr {Vendor Information}
Calculations: 265 hp * 0.000155 lb/hp-hr * 500 hr/yr * 0.0005 ton/lb = 0.01 ton/yr

$NO_x$ Emissions
Emission Factor: 0.0148 lb/hp-hr { Vendor Information }
Calculations: 265 hp * 0.0148 lb/hp-hr * 500 hr/yr 0.0005 ton/lb = 0.98 ton/yr

CO Emissions
Emission Factor: 0.000638 lb/hp-hr { Vendor Information }
Calculations: 265 hp * 0.000638 lb/hp-hr * 500 hr/yr * 0.0005 ton/lb = 0.04 ton/yr

VOC Emissions
Emission Factor: 0.000506 lb/hp-hr { Vendor Information }
Calculations 265 hp * 0.000506 lb/hp-hr * 500 hr/yr * 0.0005 ton/lb = 0.03 ton/yr

$SO_x$ Emissions
Emission Factor: 0.00205 lb/hp-hr {AP-42 Table 3.3-1, 10/96}
Calculations 265 hp * 0.00205 lb/hp-hr * 500 hr/yr * 0.0005 ton/lb = 0.14 ton/yr

(SOURCE #04)
Cooling Towers

Recirculation Rate = 64,450 gal/min
TDS concentration = 1488 ppm

$PM/PM_{10}$ Emissions
Emission Factor: 0.002% drift rate {Manufacturer's Guarantee}
Calculations: 64,450 gal/min x 60 min/hr x 8.34 lb $H_2O$/gal x 0.002% drift = 645 lb $H_2O$/hr
645 lb $H_2O$ drift/hr x 1488 lb PM/MM lbs $H_2O$ = 0.96 lb/hr
0.96 lb/hr x 8760 hr/yr x 1 ton/2000 lb = 4.20 ton/yr

## V. Existing Air Quality

The MMI facility is located east of Highway 87 approximately 2 miles north of Great Falls in Section 30, Township 21 North, Range 4 East, in Cascade County, Montana. The facility sits on a relatively flat plain at an elevation of 3,520 feet with mountain ranges approximately 30 miles or more to the east, south, and west of the facility and lower hills (buttes) to the north and northwest. The closest Class I area is the Gates of the Mountains wilderness area located approximately 75 kilometers (km) southeast of the site.

The air quality classification for the MMI project area is "Unclassifiable or Better than National Standards" (40 CFR 81.327) for the National Ambient Air Quality Standards (NAAQS) for all criteria pollutants. A narrow area of Great Falls along 10th Avenue South (bounded by 9th Avenue South on the north, 11th Avenue South on the south, 54th Street South on the east and 2nd Street South on the west) was previously classified as a non-attainment area for CO, but has been redesignated attainment.

## VI. Ambient Air Impact Analysis

Sierra Research submitted modeling on behalf of MMI on July 13, 2006. The Department has worked with MMI and Sierra Research to establish a complete dispersion modeling analysis for demonstration of compliance with applicable increments and standards.

EPA's Industrial Source Complex (ISC3) model was used along with EPA's BPIP - PRIME downwash algorithm. Cumulative impact modeling for $PM_{10}$ included sources at the International Malting Corporation (IMC) facility, which shares a property boundary with the MMI property. BPIP-PRIME downwash algorithm was used for the IMC and MMI point sources for the Class II analysis. The Department ran the ISC-PRIME modeling files obtained from Sierra Research to verify the modeling results.

MMI Class II modeling used five years of surface meteorological data (1987-1991) collected at the Great Falls Airport National Weather Service (NWS) station. Surface met data was processed with corresponding upper air data from the Great Falls NWS station.

The final modeling results are different from those submitted by Sierra Research in the permit application due primarily to changes in source locations. The modeling locations used for the MMI sources were originally based on the WGS84 datum. Because the USGS 7.5' quad base map and the cumulative impact source locations were based on the NAD27 datum, the Department requested that Sierra Research convert the source locations in UTM's from WGS84 to NAD27. The Department also removed receptors from within the IMC property when modeling IMC emissions. The receptor grid elevations were obtained from digital elevation model (DEM) files using the using 7.5-minute United States Geological Survey (USGS) topographical maps.

*CLASS II PSD INCREMENT COMPLIANCE DEMONSTRATION*

MMI provided significant impact analyses for both the simple cycle and combined cycle phases. Results from the two phases are similar and have been combined in Table 1. MMI's significant impact model results are compared to the applicable Class II significant impact levels (SIL's) in Table 1. MMI's impacts exceed the SIL for $PM_{10}$ and NOx. The maximum radius of impact (ROI) is 0.9 km for 24-hour $PM_{10}$. The area within the ROI is referred to as the significant impact area (SIA).

**Table 1: MMI Simple/Combined Cycle Significant Impact Modeling**

| Pollutant | Avg. Period | Modeled Conc. ($\mu g/m^3$) | Class II SIL[a] ($\mu g/m^3$) | Significant (y/n) | Radius of Impact (km) |
|---|---|---|---|---|---|
| $PM_{10}$ | 24-hr | 12.8 | 5 (1)[b] | Y | 0.9 |
| | Annual | 2.34 | 1 | Y | 0.6 |
| $NO_x$ [c] | Annual | 1.40 | 1 | Y | 0.4 |
| CO | 1-hr | 562 | 2,000 | N | ------ |
| | 8-hr | 274 | 500 | N | ------ |
| $SO_2$ | 3-hr | 2.64 | 25 | N | ------ |
| | 24-hr | 1.73 | 5 (1)[b] | N | ------ |
| | Annual | 0.13 | 1 | N | ------ |
| $O_3$ | Total VOC emissions are less than 100 tpy; the source is exempt from $O_3$ analysis. | | | | |

[a] All concentrations are 1st-high for comparison to SIL's.
[b] If a proposed source is located w/in 100 km of a Class I area, an impact of 1 $\mu g/m^3$ on a 24-hour basis is significant.
[c] Ambient Ratio Method (ARM) is not used for NOx.

MMI's modeling showed significant impacts for $NO_x$ and $PM_{10}$, triggering the requirement for cumulative impact modeling. Sierra Research initially included all the Great Falls area sources in the cumulative impact modeling. During review, the Department only included the IMC $PM_{10}$ and $NO_x$ emissions because IMC is adjacent to the MMI property. Other sources are not expected to

impact the MMI significant impact area. Source parameters for the IMC sources can be viewed in the IMC permitting file. Class II increment modeling results are compared to the applicable PSD increments in Table 2.

**Table 2: Class II Increment Compliance Demonstration**

| Pollutant | Avg. Period | Met Year | Class II Modeled Conc. ($\mu g/m^3$) | Class II Increment ($\mu g/m^3$) | % Class II Increment Consumed | Peak Impact Location (UTM Zone 12) |
|---|---|---|---|---|---|---|
| PM10 | 24-hr | 1989 | 22.3[(a)] | 30 | 74% | (480031, 5265410) |
| | Annual | 1987 | 8.46 | 17 | 50% | (480469, 5265702) |
| NO2 | 1-hr | --- | --- | --- | --- | --- |
| | Annual | 1990 | 12.45[(b)] | 25 | 50% | (480468, 5265823) |

(a) $PM_{10}$ compliance is based on the high-6$^{th}$-high modeled impact when using 5 years of meteorological data.
(b) Annual $NO_2$ calculated using the Ambient Ratio Method.

*NAAQS/MAAQS COMPLIANCE DEMONSTRATION*

NAAQS/MAAQS modeling was conducted for $PM_{10}$ using fugitive and point source emissions from MMI and IMC. $NO_2$ cumulative impact modeling used point source emissions from MMI and IMC. No other major stationary sources are expected to impact MMI's SIA.

$PM_{10}$ and $NO_2$ modeling results are compared to the applicable MAAQS and NAAQS in Table 3. Modeled concentrations show the impacts from MMI and IMC sources and include the Department's general background values. As shown in Table 3, the modeled concentrations are below the applicable NAAQS/MAAQS.

**Table 3: NAAQS/MAAQS Compliance Demonstration**

| Pollu-tant | Avg. Period | Modeled Conc.[a] (μg/m3) | Backgrnd Conc. (μg/m3) | Ambient Conc. (μg/m3) | NAAQS (μg/m3) | % of NAAQS | MAAQS (μg/m3) | % of MAAQS |
|---|---|---|---|---|---|---|---|---|
| PM10 | 24-hr | 22.3[(a)] | 30 | 52.3 | 150 | 35% | 150 | 35% |
| | Annual | 8.46 | 8 | 16.5 | 50 | 32% | 50 | 32% |
| NO2 | 1-hr | 282[(b)] | 75 | 357 | --- | --- | 564 | 63% |
| | Annual | 12.45[(b)] | 6 | 18.4 | 100 | 18% | 94 | 20% |

(a) $PM_{10}$ compliance is based on the high-6th-high modeled impact when using 5 years of meteorological data.
(b) Annual $NO_2$ calculated using the Ambient Ratio Method. 1-hr $NO_2$ calculated using the Ozone Limiting Method.

*CLASS I INCREMENT ANALYSIS*

Class I increment analysis was not included in this modeling, as approved by the Department. The closest Class I area is the Gates of the Mountains wilderness area located approximately 75 kilometers (km) southeast of the site.

*CONCLUSION*

The modeling results for renewal of MMI's natural gas-fired power plant project have demonstrated compliance with the NAAQS/MAAQS and PSD increments.

VII. Taking or Damaging Implication Analysis

As required by 2-10-105, MCA, the Department conducted a private property taking and damaging assessment and determined there are no taking or damaging implications.

VIII. Environmental Assessment

An environmental assessment, required by the Montana Environmental Policy Act, was completed for this project. A copy is attached.

Analysis Prepared By: Christine Weaver
Date: July 11, 2006

DEPARTMENT OF ENVIRONMENTAL QUALITY
Permitting and Compliance Division
Air and Waste Management Bureau
P.O. Box 200901, Helena, Montana 59620
(406) 444-3490

**FINAL ENVIRONMENTAL ASSESSMENT (EA)**

Issued To: Montana Megawatts I, LLC
125 S. Dakota Avenue
Sioux Falls, SD 57104-6403

Air Quality Permit Number: #3154-04

Preliminary Determination Issued: 8/22/06
Department Decision Issued: 9/22/06
Permit Final:

1. *Legal Description of Site*: MMI proposes to build a natural gas-fired power plant to be located approximately 2 miles north of Great Falls. The legal description of the site is Section 30, Township 21 North, Range 4 East, in Cascade County, Montana. MMI owns approximately 140 acres of property in the area and would use approximately 30 acres for the proposed facility.

2. *Description of Project*: The Department proposes to issue MAQP #3154-04 to MMI for the construction and operation of a nominal 262-MW combined cycle natural gas-fired power plant. A full permit application, including BACT review, was submitted, since facility construction had not commenced within the three (3) years allowed by the 2002 permit.

   The facility would originally operate in simple cycle mode, and would consist of two General Electric Model PG7121EA gas turbines. Within two years, the facility would operate in combined cycle mode, and each of the above turbines would be supplemented with a HRSG and other ancillary equipment that would support operation of the turbines. The combined cycle turbines use the exhaust heat from the simple cycle turbines and additional heat from the duct burning (natural gas burners) to produce steam, which, in turn, drives a steam turbine. The turbines would be contained in a large building.

3. *Objectives of Project*: The objective of the project would be for MMI to establish a nominal 262-MW natural gas-fired power plant to generate marketable electricity within their field of expertise (natural gas compression and transmission).

4. *Alternatives Considered*: In addition to the proposed action, the Department also considered the "no action" alternative. The "no action" alternative would deny the issuance of the air quality preconstruction permit to the proposed facility. However, the Department does not consider the "no action" alternative to be appropriate because MMI demonstrated compliance with all applicable rules and regulations as required for permit issuance. Therefore, the "no action" alternative was eliminated from further consideration.

5. *A Listing of Mitigation, Stipulations, and Other Controls*: A list of enforceable conditions, including a BACT analysis, would be included in Permit #3154-04.

6. *Regulatory Effects on Private Property*: The Department considered alternatives to the conditions imposed in this permit as part of the permit development. The Department determined that the permit conditions would be reasonably necessary to ensure compliance with applicable requirements and demonstrate compliance with those requirements and would not unduly restrict private property rights.

7. The following table summarizes the potential physical and biological effects of the proposed project on the human environment. The "no action" alternative was discussed previously.

| **Potential Physical and Biological Effects** | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Major | Moderate | Minor | None | Unknown | Comments Included |
| A. | Terrestrial and Aquatic Life and Habitats | | | X | | | yes |
| B. | Water Quality, Quantity, and Distribution | | | X | | | yes |
| C. | Geology and Soil Quality, Stability, and Moisture | | | X | | | yes |
| D. | Vegetation Cover, Quantity, and Quality | | | X | | | yes |
| E. | Aesthetics | | | X | | | yes |
| F. | Air Quality | | | X | | | yes |
| G. | Unique Endangered, Fragile, or Limited Environmental Resource | | | X | | | yes |
| H. | Demands on Environmental Resource of Water, Air, and Energy | | | X | | | yes |
| I. | Historical and Archaeological Sites | | | X | | | yes |
| J. | Cumulative and Secondary Impacts | | | X | | | yes |

SUMMARY OF COMMENTS ON POTENTIAL PHYSICAL AND BIOLOGICAL EFFECTS: The following comments have been prepared by the Department.

A. Terrestrial and Aquatic Life and Habitats

Overall, the impacts from this project to terrestrial and aquatic life and habitats would be minor because of the relatively small portion of land, approximately 30 of the 140 acres owned by MMI, that would be disturbed and the minor impact to the surrounding area from the air emissions (considering air dispersion characteristics).

Terrestrials (such as deer, antelope, rodents) use the general area of the facility. However, the surrounding area is currently a mix of predominantly agriculture with some industrial facilities. Other industrial facilities include the International Malting Company located on adjacent property, and Montana Refining Company, Malmstrom Air Force Base, and the proposed Montana Ethanol Project (formerly Agri-Technology Corporation or American Agri-Technology Operating, LLC), which are located within a few miles of the property boundary.

Aquatic life and habitats would realize little impact from the proposed facility because MMI is not proposing to directly discharge any material to the surface or ground water in the area, other than a minor amount of stormwater.

The resulting deposition of air emissions to any water body would be minor. The permitted air emissions consume less than 75% of the PM10 Class II increment and less than 50% of the NOx increment. The relatively small amount of air impact would correspond to an equally small amount of deposition.

MMI would use municipal water and sewer, which would result in very little impact on the terrestrial and aquatic life and habitats because the activities would result in minimal disturbance to land/water and the disturbances would be temporary in those areas that are not already disturbed. The sewer and water system upgrade may require a minor disruption of the area, but the impacts would be minor and of a short time duration. Overall, the impacts from this project to terrestrial and aquatic life and habitats would be minor.

B. Water Quality, Quantity, and Distribution

The proposed facility would result in minor impacts to water quality, quantity, and distribution in the area. All water for the facility would be obtained from the Great Falls municipal water supply, and all spent water would be discharged to the Great Falls city sewer, other than stormwater discharges. Construction stormwater will be permitted before construction, and a stormwater discharge permit will be permitted once construction is complete.

In a combined cycle power plant, fuel is combusted and the resulting heat is then used to create steam to turn a steam generator. Outlet steam from the generator is cooled in a cooling tower. Although a substantial amount of water would be used in the cooling tower, the water would be recirculated through the system for approximately 8 concentration cycles, minimizing the demand for water or sewer use. The cooling tower system would require 1,300 gallons per minute (gpm) make-up water, which is evaporated or blown-down to the sewer. Other water necessary for plant operation would be potable water and sanitary sewer service for approximately 15 people, and the water necessary for general plant cleaning.

As described in Section 7.F of this EA, the maximum impacts from the air emissions from this facility would be relatively minor, and therefore the corresponding deposition of the air pollutants in the area would also be very minor. Furthermore, based on the dispersion characteristics (wind speed, wind direction, atmospheric stability, stack temperature, etc.) of the area, the highest impacts would not be at or near the river or other surface water.

The impacts from the water demands for this facility would be minor, due to the make-up water required for the cooling tower. However, there would only be minor water quality impacts from discharges since all spent water is discharged to the municipal sewer system and there will be insignificant stormwater discharge.

C. Geology and Soil Quality, Stability, and Moisture

The impacts to the geology and soil quality, stability, and moisture from this facility would be minor because the project would impact a relatively small portion of land and the amount of resulting deposition of the air emissions would be small. Approximately 30 acres or less would be disturbed for the physical construction of the power plant. Soil stability in the immediate vicinity of the proposed facility would likely be impacted by the new footings and foundations required for the facility. The major construction required for the facility would be the building that would house the turbines. The building dimensions would be approximately 100-feet wide, 315-feet long, and 30-feet high.

The facility would not be discharging any material directly to the soil of the immediate area other than stormwater discharge. Some of the air emissions from the facility may deposit on local soils, but that deposition would result in only a minor impact to local areas because of the air dispersion characteristics of the area (see Section 7.F of this EA).

Any water/sewer/site upgrades during construction would result in very little impact on the geology and soil quality, stability, and moisture because the activities would result in minimal disturbance to land/water and the disturbances would be temporary.

D. Vegetation Cover, Quantity, and Quality

The proposed project would result in minor impacts on the vegetative cover, quantity, and quality in the immediate area because only a small amount of property would be disturbed and the resulting deposition from air emissions would be relatively small. Approximately 30 acres of land would be impacted by the construction and operation of the facility. In comparison to the surrounding agricultural and industrial properties, the disturbance of this acreage would be a very small percentage of the vegetative cover in the area. See Section 8.D of this EA. In addition, as described in Section 7.F of this EA, the impacts from the air emission from this facility are minor. As a result, the corresponding deposition of the air pollutants on the surrounding vegetation would also be minor.

Any water/sewer/site improvements would have little, if any impact on the vegetation in the area because the disturbances would occur on previously disturbed land, such as agricultural or sites already disturbed, and other relatively small portions of land. Those disturbances would be of short duration and the area would eventually return to their current status. Therefore, the proposed project would result in minor impacts on the vegetative cover, quantity, and quality.

E. Aesthetics

The impacts to the aesthetics of the area from this project would be minor because the size of the structures required for this facility would be relatively small, other industrial and commercial facilities/structures are located in the nearby area, the facility would barely (if at all) be visible from gathering places along the river, and the noise from the facility would be low. The facility would consist of one large building approximately 30 feet tall, and other ancillary equipment that would support the operation of the facility. The simple cycle stacks will be 92 feet tall; the combined cycle stacks will be 120 feet tall. For reference, silos and other structures for the nearby IMC are approximately 108 feet tall.

MMI would be visible from Highway 87 (approximately ½ mile away) and may be partially visible from the Lewis and Clark Interpretive Center (approximately 1.8 miles away) and Giant Springs Heritage State Park (approximately 1.9 miles away). Based on other structures visible from the Lewis and Clark Interpretive Center, such as the radio/television towers, the water tank, houses, and electrical substations, it appears that a small portion of the two 120 foot stacks at MMI may be visible. In addition to the partially visible stacks, steam plumes would be visible from the facility on those days with temperatures low enough to cause steam plumes to form.

The MMI facility would not affect the Upper Missouri River Breaks National Monument.

The land at the proposed site is currently used for agricultural purposes; however, other industry currently operates in the surrounding area. IMC is located in the same industrialized area, and a bus "yard" is adjacent to the facility. In addition, Montana Refining Company is located approximately 2 miles away, Montana Ethanol Project (formerly Agri-Technology Corporation or American Agri-Technology Operating, LLC) is proposed to locate at a site approximately 3.8 miles away, Malmstrom Air Force Base is located approximately 4 miles away, and numerous radio/television towers are nearby.

MMI would result in additional noise for the area. The noise impacts from this facility on the surrounding area would be minor because the noise from the facility is relatively quiet when compared to other common sources and the distance to the nearest residence is approximately ½ mile away. The near field sound pressure level (SPL) contribution from the GE-supplied equipment is guaranteed not to exceed 96 decibels (dBA) when measured 3 feet in the horizontal plane and at an elevation of 5 feet above machine baselines or personnel platforms with the equipment operating at base load. The far field SPL contribution is guaranteed not to exceed 67 dBA when measured at a distance of 400 feet from the nearest equipment and operated at the rated load. For reference, normal street noise is estimated to be approximately 70 dBA, and normal close-up conversation is estimated to be approximately 60 dBA. In addition, since noise impacts are minimized by distance, the fact that the nearest resident is approximately ½ mile (2640 feet) from the facility location would further minimize the impacts from this facility.

The area would also receive increased vehicle use as a result of the proposed project; however, the Department does not believe that the amount of vehicle trips in the area would increase substantially over the existing traffic in the area. The vehicles would likely use the existing roads in the area en route to the roads established as part of the actual facility.

Visible emissions would be limited to 20% opacity. There would not be an increase in odors with the addition of this facility to the area because odors from the combustion of natural gas exist in negligible amounts and are only slightly perceptible, if at all. Currently, odors from the existing refinery are noticeable throughout the Great Falls area and would overwhelm any odors from the proposed facility.

Overall, the impacts to the aesthetics of the area from this project would be minor.

F. Air Quality

The proposed MMI facility would result in minor air quality impacts.

MMI's potential emissions of regulated pollutants in the simple cycle phase are: 99.3 tpy of $NO_x$, 3.0 tpy of sulfur dioxide $SO_2$, 25.0 tpy of $PM_{10}$, 20.3 tpy of VOCs and 86.9 tpy of CO. MMI's potential emissions of regulated pollutants in the combined cycle phase are: 79.2 tpy of $NO_x$, 11.9 tpy of $SO_2$, 99.1 tpy of $PM_{10}$, 21.9 tpy of VOCs and 95.3 tpy of CO.

The air quality classification for the MMI project area is "Unclassifiable or Better than National Standards" (40 CFR 81.327) for the National Ambient Air Quality Standards (NAAQS) for all criteria pollutants. The closest Class I area is the Gates of the Mountains wilderness area located approximately 75 kilometers (km) southeast of the site.

Emissions of $NO_x$, $SO_2$, CO, $PM_{10}$ and VOC were modeled to demonstrate compliance with the Montana and National Ambient Air Quality Standards (MAAQS). PSD increment compliance demonstration was also provided $NO_2$ and $PM_{10}$ because the project has significant $NO_2$ and $PM_{10}$ impact and the minor source baseline date for $NO_2$ and $PM_{10}$ has been established in the area. Modeling results are included in the permit analysis.

In addition to the modeling analyses, a BACT analysis was performed as part of the permit action. MMI proposed to install low NOx burners, selective catalytic reduction units and a catalytic oxidizer to substantially reduce $NO_x$ and CO respectively. The results of the BACT analysis were factored into the modeling analysis.

Furthermore, MMI requested limits within the permit to stay below the New Source Review permit thresholds. The permit would contain an annual emission limit of less than 100 tons per year (tpy) each for $NO_x$, CO, and $PM/PM_{10}$.

MMI would also emit HAPs. A major facility for HAPs is defined as a stationary source that has the potential to emit more than 10 tons per year of any individual HAP or 25 tpy of all HAPs combined. The highest individual emission rate of an individual HAP would be approximately 2 tpy, and the combined emission rate of all HAPs would be about 7 tpy. Not only is this source not considered a major source for HAPs, but any impact from HAPs would be minor because the emissions of the HAPs would be dispersed by the wind speed, wind direction, atmospheric stability, stack temperature, and other dispersion parameters in the area.

MMI would emit carbon dioxide ($CO_2$), which is not a regulated pollutant under either the Federal or Montana Clean Air Acts. Any impact from $CO_2$ would also be minor-when compared to the $CO_2$ emissions from other industrial sources in the state and other natural sources of $CO_2$. Power in Montana is generally created using either one of two fuels—natural gas or coal. Coal-fired power plants generate 1.8 times more $CO_2$ than a similar sized natural gas fired power plant.

Upgrading the water /sewer/utilities for MMI would result in very little air quality impact because no major air emission activities would be required. The sewer and water system upgrade may require the use of motor vehicles, but the impacts would be minor and of a short time duration. Similarly, minor fugitive dust emissions would result from the sewer and water system upgrade as well, but the emissions would be temporary.

The modeling results for renewal of MMI's natural gas-fired power plant project have demonstrated compliance with the NAAQS/MAAQS and PSD increments. Overall, the air impacts from MMI are expected to be minor.

G. Unique, Endangered, Fragile, or Limited Environmental Resources

To identify any species of special concern in the immediate area of the proposed project, the Department contacted the Montana Natural Heritage Program of the Natural Resource Information System (NRIS). The Natural Heritage Program files identified two species of special concern in the 1-mile buffer area surrounding the section, township, and range of the proposed facility. The two plant species identified were the *entosthodon rubiginosus* and the *funaria americana*. Both of these species are found on or near the Missouri River. The search results indicated that both of these plant species were previously recorded within a 5-mile radius (approximately 2 miles). The 5-mile radius includes a small portion of the Missouri River.

Based on the modeled air quality impacts from MMI, the proposal would have little, if any chance of impacting the unique, endangered, fragile, or limited environmental resources in the area. Due to the plume characteristics from the proposed facility, the emissions would predominantly be carried to the north and east of the facility, away from the location of the plant species of special concern.

The proposed project would have minor impacts on limited, non-renewable resources because the amount of natural gas consumed by the facility would be relatively small in comparison to the natural gas consumption in Montana and the nation. See the discussion of Energy in Section 7.H of this EA.

H. Demands on Environmental Resource of Water, Air, and Energy

As described in Section 7.B of this EA, impacts to the water resource would be minor because, although the cooling tower would require approximately 1,300 gpm make-up water, the water would either evaporate or be discharged back to the city through the sewer system. The facility will not directly discharge any material to the surface or ground water in the area other than a minor amount of stormwater runoff.

As described in Section 7.F of this EA, the impact on the air resource in the area of the facility would be minor. Ambient air modeling for $NO_X$, CO, VOC, PM, $PM_{10}$, and $SO_2$ was conducted for the facility at "worst case" conditions that demonstrates that the emissions from the proposed facility would not exceed any ambient air quality standard. As a result of the ambient air quality analysis presented in Section 7.F of the EA, Permit #3154-04 would contain conditions limiting the emissions from the facility.

The impacts to the energy resource from this facility would be minor. The facility would consume approximately 17,500 MMscf/year of natural gas. In comparison to the natural gas consumed nationally and many other facilities in the area, this is minor.

I. Historical and Archaeological Sites

The impacts on historical and archaeological sites would be minor because the site location contained no visible standing structures, the facility would physically impact a small amount of property (approximately 30 acres), the facility would locate within an area that has been plowed for agricultural purposes, and the site location is in an area that would likely not have been used for any significant historical or archaeological activity. The lack of standing structures indicates lack of historical activity within the proposed site location. Since the topsoil in the area is 4-6 inches thick and covers glacial gravel, any possibility of historical or archaeological material being present was destroyed by the agricultural activities (plowing) in the area.

The physical location of the site also indicates that it was not likely a location for significant historical or archaeological activity. The site location is located in rolling terrain on the bench above the Missouri River. The nearest portion of the Missouri River to the site location is approximately 1.5 miles away, and the bluff is approximately 1.25 miles away from the site location.

The Department contacted the Montana Historical Society – State Historic Preservation Office (SHPO) in an effort to identify any historical, archaeological, or paleontological sites or findings near the proposed project. SHPO's records indicate that there are currently no previously recorded cultural properties within the project site. Because of the fact that severe agricultural activities have occurred in the area, the likelihood of finding undiscovered or unrecorded historical properties is practically nil.

In an effort to expand the cultural resource inventories available in the state, SHPO recommended that a cultural resource inventory be conducted prior to the construction. However, neither the Department nor SHPO has the authority to require MMI to conduct a cultural resource inventory. SHPO did not identify that they had concern that historical, archaeological, or paleontological sites were present on the site. In fact, numerous other structures have been constructed in the immediate area of the facility with no identification of historical or archaeological artifacts to SHPO.

J. Cumulative and Secondary Impacts

Overall, the cumulative and secondary impacts from this project on the physical and biological aspects of the human environment would be minor. In addition, the highest impacts from industrial sources, other than IMC, are not expected to occur the same receptors as the MMI impacts. The modeling analysis indicates that the cumulative emissions from MMI and other industrial facilities will not violate the MAAQS, NAAQS or Class II PSD increments.

8. The following table summarizes the potential social and economic effects of the proposed project on the human environment. The "no action" alternative was discussed previously.

| **Potential Social and Economic Effects** | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Major | Moderate | Minor | None | Unknown | Comments Included |
| A. | Social Structures and Mores | | | | X | | yes |
| B. | Cultural Uniqueness and Diversity | | | | X | | yes |
| C. | Local and State Tax Base and Tax Revenue | | | X | | | yes |
| D. | Agricultural or Industrial Production | | | X | | | yes |
| E. | Human Health | | | X | | | yes |
| F. | Access to and Quality of Recreational and Wilderness Activities | | | | X | | yes |
| G. | Quantity and Distribution of Employment | | | X | | | yes |
| H. | Distribution of Population | | | | X | | yes |
| I. | Demands for Government Services | | | X | | | yes |
| J. | Industrial and Commercial Activity | | | X | | | yes |
| K. | Locally Adopted Environmental Plans and Goals | | | | X | | yes |
| L. | Cumulative and Secondary Impacts | | | X | | | yes |

SUMMARY OF COMMENTS ON POTENTIAL SOCIAL AND ECONOMIC EFFECTS: The following comments have been prepared by the Department.

A. Social Structures and Mores
B. Cultural Uniqueness and Diversity

The proposed facility would not cause a disruption to any native or traditional lifestyles or communities (social structures or mores, or cultural uniqueness and diversity) in the area because the land use proposal would not be out of place given the industrial land use of the larger area surrounding the proposed site and the fact that the immediate surrounding area would remain agricultural.

C. Local and State Tax Base and Tax Revenue

The facility would have a minor effect on the local and state tax base and tax revenue because it would generate approximately $2.5 million dollars per year in state and local taxes, would generate taxes for approximately 25 years (including the 5-year tax holiday), and would employ numerous people (taxpayers) during construction and approximately 15 people after completion. MMI would be privately funded.

Cascade County officials submitted information during the public comment period for Permit #3154-00 that indicated an additional $2.5 million dollars in new state and local property taxes would result from the facility. The collection of the $2.5 million dollars in property taxes would begin after a statutory 5-year tax holiday. Of the $2.5 million dollars, the local tax benefits would include $422,000 per year for Cascade County, $425,000 per year for the City of Great Falls, and $800,000 per year for Great Falls Public Schools. Also noted in the correspondence from Cascade County was the fact that the power plant would pay high taxes while requiring fewer than average services.

Comments were received during the public draft stage for Permit #3154-00 questioning why the citizens of Great Falls and Montana should have to subsidize the taxes forfeited during the 5-year tax holiday. In response to this comment, the Department contacted the Department of Revenue and found out that the citizens of Montana would not be subsidizing the taxes forfeited during this period. Furthermore, the tax benefit from the proposed facility outweighs the forfeited taxes during the tax holiday by a substantial margin. According to MMI officials, the business plan for this facility is based on operating 25-30 years.

Comments were also received during the public draft stage for Permit #3154-00 that questioned the impact this facility would have on property values in the area. The proposed plant would be located approximately ½ mile (2640 feet) from the nearest residence and should not be aesthetically obtrusive. Other factors that are traditionally associated with a decrease in property values such as odors, fumes, or significant increases in traffic, dust, vibration, or noise would not be present at this location. In addition, an appraisal of individual tracts is beyond the scope of environmental analysis required by the Montana Environmental Policy Act.

D. Agricultural or Industrial Production

The impacts to agricultural and industrial production in the area from this facility would be minor because the facility would physically impact such a small amount of land, the impact from the air emissions on the land would be small, and the amount of electricity produced to assist other industrial activities within the state is relatively small. The facility would be located on 30 acres of the 140 acres owned by MMI.

As described in Section 7.F of the EA, the air quality impacts from this facility are minor, and the resulting deposition of the pollutants from the MMI project is consequently also minor. In addition, as described in Section 7.F, the fact that the facility would comply with the NAAQS (protect public health and promote public welfare) indicates that the impacts from the facility would be minor.

The MMI facility may assist other industrial production because information submitted as part of the original application indicated that two-thirds of the power (175 MW) would be available to Montana sources to potentially assist with industrial production. In comparison to the power demands of industrial sources within Montana, the amount of power available to the industrial sources is relatively small.

E. Human Health

As described in Section 7.F of the EA, the impacts from this facility on human health would be minor because the impact from the air emissions would be greatly dispersed before reaching an elevation where humans were exposed. Also, as described in Section 7.F, the modeled impacts from this facility, taking into account other dispersion characteristics (wind speed, wind direction, atmospheric stability, stack height, stack temperature, etc.), are well below the MAAQS, NAAQS, and PSD Increments. The air quality permit for this facility

incorporates conditions to ensure that the facility would be operated in compliance with all applicable rules and standards. These rules and standards are designed to be protective of human health.

Besides the criteria pollutants, the impacts from HAPs would also be greatly minimized by the dispersion characteristics of the facility and the area (wind speed, wind direction, atmospheric stability, stack temperature, facility emissions, etc.). Impacts from other common activities (such as fueling your vehicle for example) would have a greater impact on human health for HAPs because of the concentrations at the point of exposure.

F. Access to and Quality of Recreational and Wilderness Activities

The facility would not have an impact on recreational or wilderness areas. The recreational activities in the area are approximately 1½ to 2 miles away, and most of the nearby recreational activities are upwind of the predominant wind pattern. No significant recreational or wilderness activities exist within the MMI property boundaries. Based on the modeling analysis (see Section 7.F of the EA) and the distance between and direction from the recreational sites and the MMI site, there should not be noticeable impacts to recreational opportunities in the area.

Furthermore, the project would not affect the Upper Missouri River Breaks National Monument since it is approximately 36 miles from the site location of the proposed MMI power plant.

G. Quantity and Distribution of Employment

There would be a minor effect on the employment of the area from this project because it would result in numerous construction-related employment opportunities and approximately 15 full-time positions. MMI estimates that approximately 100 employees would be needed for the construction of the facility. Upon completion, the normal operation of the power plant would employ approximately 15 people, full-time.

When feasible and economical, MMI plans on using local contractors and workers for construction and operation. The feasibility would be dependent on availability and qualifications. As far as economical, MMI contends that the lowest cost contractors would have the best chance of being utilized.

The sewer and water system upgrades would require some construction and corresponding man-hours. However, the impacts on quantity and distribution of employment would be minor because the required work would be temporary and would likely be handled by current employees of the City of Great Falls.

H. Distribution of Population

The entire project would not affect the normal population distribution in the area because, excluding the 15 full-time positions that would result from the power plant, the remainder of the jobs created from this project would be temporary. Neither the 15 full-time positions nor the numerous temporary construction-related positions would likely affect the distribution of population in the area.

Most employees required for the construction and operation of the power plant would likely be from Great Falls or temporarily locate within Great Falls since housing would be easier to locate. For the other construction related activities with this project, the employees would likely be existing staff in the area and would likely not be moving to Great Falls.

I. Demands of Government Services

Demands on government services from this facility would be minor because, as described in the letter from Cascade County, the facility would pay relatively high taxes and require fewer than average government services. Minor increases may be seen in traffic on existing roads in the area while the facility is operating. All water for the facility would be obtained from the Great Falls municipal water supply, and all spent water would be discharged to the Great Falls city sewer.

The acquisition of the appropriate permits by the facility, the permits for the associated activities of the project, and compliance verification with those permits would also require minor services from the government.

J. Industrial and Commercial Activity

The MMI facility would represent a minor increase in industrial activity in the area. The facility would operate 24 hours a day and 7 days per week generating electricity.

K. Locally Adopted Environmental Plans and Goals

The City of Great Falls contains an area that was previously classified as nonattainment area for CO along 10$^{th}$ Avenue South. However, the area has been redesignated as attainment. Furthermore, the proposed facility is outside of the nonattainment area and would result in only minor impacts because the CO emissions from the facility have been modeled to demonstrate that the facility would not have a significant impact on CO. The modeling inputs were based on the "worst case" CO emissions from the facility. Not only would the facility seldom operate at "worst case" conditions, but the prevailing wind pattern in the area would carry the emissions from the facility to the north and east of the plant, away from the nonattainment area.

The Department is unaware of any other locally adopted environmental plans and goals that would be affected by the facility or the other portions of the project as identified at the beginning of this EA.

L. Cumulative and Secondary Impacts

Overall, the cumulative and secondary impacts from this project on the social and economic aspects of the human environment would be minor because several new full-time employment opportunities would result, many construction related employment opportunities would be available, and the facility would sell reasonably priced power to other residents and industries in Montana.

The MMI project would result in additional jobs for the Great Falls area. As described in Section 8.G of this EA, the facility would employ approximately 15 full-time people and approximately 100 people during the construction phase. The "day-to-day" normal operation positions and the construction-related positions created by the MMI project would bring additional money into the Great Falls economy.

*Recommendation*: An EIS is not required.

*If an EIS is not required, explain why the EA is an appropriate level of analysis*: All potential effects resulting from construction and operation of the proposed facility are minor, therefore, an EIS is not required. In addition, the source would be applying the Best Available Control Technology and the analysis indicates compliance with all applicable air quality rules and regulations.

*Other groups or agencies contacted or which may have overlapping jurisdiction*: Department of Environmental Quality – Permitting and Compliance Division (Air and Waste Management Bureau); Montana Natural Heritage Program; and State Historic Preservation Office (Montana Historical Society).

*Individuals or groups contributing to this EA*: Department of Environmental Quality (Air and Waste Management Bureau and Water Quality Bureau) Montana Natural Heritage Program, and State Historic Preservation Office (Montana Historical Society).

*EA Prepared By*: Christine Weaver
*Date*: 08/14/06